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Psychophysiological Characteristics of Sensorimotor Activity of Operators After Short-Term Simulated Weightlessness

907C0423A Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 9-12

[Article by V. A. Ponomarenko, V. V. Lapa and I. S. Nikitin]

[Abstract] Psychophysiological tests were conducted on operators to assess the effects of weightlessness on sensorimotor efficiency and operational task performance. Weightlessness was simulated by a -10° orthostatic position for 6 days, with a pressure suit applying excess pressure of 60 mm Hg to the lower half of the body, and one-day immersion in water. The results demonstrated that after a period of weightlessness, fine motor cooordination and performance suffer in the immediate post-weightlessness period, which may be a critical factor upon entering the earth's atmosphere after space flight. The deterioration in performance was described as de-automation of learned habits as a result of changes in the functional status of the motor analyzer and proprioception. Deterioration was evident in loss of strength and endurance, as well as in over-estimation of effort required for task completion. In practical terms, these observations indicate that upon re-entering the earth's gravitatonal field, the pilot's motor activity will be regulated essentially by the second signal level. Accordingly, performance under these conditions may be predicted from evaluation of differential thresholds of proprioceptive sensitivity, and training of space crews should encompass conditions involving distorted proprioception. Figures 3; References 11 (Russian).

UDC 629.78:612.821.7.019

Features of Terrestial Nighttime Sleep of Monkeys and Sleep During Space Flight Aboard Cosmos-1667 Biosatellite

907C0423B Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 12-17

[Article by G. G. Shlyk, V. S. Rotenberg, M. A, Shirvinskaya, V. I. Korolkov and V. S. Magedov]

[Abstract] Nighttime sleep patterns were assessed in two monkeys, Vernyy and Gordyy, under terrestial conditions and during a seven-day flight aboard the Cosmos-1667 biological satellite. Comparison of the eletrophysiological data derived during the night immediately before flight, during flight, and one month after the flight showed that the two primates reponded differently to the experience. In the case of Vernyy, the most pronounced perturbations in the sleep pattern were noted immediately before the flight, including frequent awakenings and reduction in delta sleep and elevation of the REM/delta sleep ratio. During the first night aboard Cosmos-1667, Vernyy exhibited the recoil effect and had the longest delta sleep seen in that animal during the period of observations. Subsequently, the sleep characteristics stabilized with reduction in the REM/delta sleep ratio, a change indicative of adaptation. A month later, good tolerance of space flight and physiological recovery were evident in low REM/delta sleep ratios and high proportion of delta sleep. The changes observed in the case of Gordyy reflected less capacity for adaptation and tolerance of stress. The maximum increase in the REM/delta sleep ratio was less than 50 percent in Vernyy, but was more than twofold in Gordyy (largely the result of extremely short delta sleep). Furthermore, Gordyy also failed to exhibit the recoil phenomenon. References 12: 3 Russian, 9 Western.

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Structural Changes in Vestibular Receptors in Rats After Flight Aboard Cosmos-1667 Biosatellite

907C0423C Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 17-26

[Article by D. V. Lychakov, A. N. Pashchinin, *A. Byadzhiyeva-Mikhaylova and *I. Khristov, *Bulgaria]

[Abstract] Light microscopy and ultrastructural studies were conducted on the vestibular strcutures of 13 male rats, approximately 13 months old, after a seven-day space flight aboard the biosatellite Cosmos-1667. The study represents the first ultrastructural assessment of the utriculus, sacculus, and ampullae of the semicircular canals. The study revealed considerable variation in the receptory epithelium. Receptor cells in the auditory striae of the uticulus and sacculus and in the central apical area of the cristae were found to be surrounded by enlarged cup-like nerve endings that cover approximately 70 percent of the receptor cell surface. The enlarged nerve endings were distributed unevenly in the various vestibular formations and differed beween the right and left ear. Comparison between one rat sacrificed immediately after the flight and those sacrificed later demonstrated that the changes in the nerve endings were evidently due to space flight, since they disappeared on re-adaptation to terrestial conditions. In conjunction with previously published data, it appears that space flights of 20 days or less do not induce persistent abnormal changes in the receptor components of the vestibular apparatus. Figures 3; References 43: 15 Russian, 28 Western.

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Mineral Density of Bones of Human Skeleton in Simulated Reduced Gravity

907C0423D Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 43-47

[Article by V. S. Oganov, A. S. Rakhmanov, S. K. Ternovoy, V. Ye. Novikov and S. L. Dubonos]

[Abstract] Changes in bone density in response to a 370-day regimen of antiorthostatic (-5°) hypokinesia were studied in nine men, 27 - 41 years old, four of whom (Group A) engaged in physical exercise throughout the experiment, and five of whom (Group B) were started on physical exercise beginning with day 120. Data derived from a variety of noninvasive techniques demonstrated a decrease in density of lumbar vertebrae, diaphyses of the femur and tibia and forearm bones in most of the subjects with considerable individual variability. The changes, however, were less pronounced in the initial stages in subjects on continuous training. Furthermore, calcium losses from the diaphyses were rather limited and were usually less than 1 percent per month. The most pronounced changes were in the density of the femoral neck, which may be used as an indicator of calcium loss under these conditions. Initiation of physical exercise at day 120 prevented further calcium loss from the femoral neck in Group B, but did not lead to reversal. References 21: 9 Russian, 12 Western.

UDC 629.78:612.015.31:546.17[06.612.766.2].08

Blood Serum Protein Composition and Nitrogen Metabolism Metabolism in Individuals Exposed to Lengthy Hypokinesia

907C0423E Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 50-54

[Article by L. B. Zaytseva, O. N. Larina and I. A. Popova]

[Abstract] In order to obtain a better understanding of factors affecting human physiology under space flight conditions, nine men 27 - 42 years old were subjected to 370 days of orthostatic hypokinesia at an angle of -5°. Physical exercise and chemotherapeutic measures intended to mitigate the adverse effects of hypokinesia were implemented in one group (Group A) of four men on day 25, and in the remaining five subjects on day 120 (Group B). The monitoring of serum protein patterns and urea, uric acid and creatinine levels, in conjunction with urine levels of uric acid and creatinine, demonstrated, for the most part, little deviation from control values. However, urine creatinine levels revealed predominance of catabolic processes in the muscle tissues, and depression of serum α_2-globulins reflected depression of hepatic biosynthetic potential. Elevation of β-globulins in both groups indicated an increase in serum concentration of low-density lipoproteins. The urinary creatinine levels in Group A individuals remained normal for approximately 170 days, but thereafter rose to the unfavorable high level seen in Group B subjects. Figures 1; References 7: 1 Russian, 6 Western.

UDC 629.78:612.886

Functional Testing During Yearlong Antiorthostatic Hypokinesia

907C0423F Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 54-56

[Article by V. M. Mikhaylov, G. V. Machinskiy, V. P. Buzulina, V. S. Georgiyevskiy, E. N. Nechayeva and S. G. Kryutchenko]

[Abstract] Cardiorespiratory functional testing and work performance were assessed in nine men subjected to 370 days of antiorthostatic (-4.5°) hypokinesia. The study was designed to monitor the efficacy of countermeasures employed against weightlessness aboard the Mir space station. The results demonstrated that the adverse effects of weightlessness were subject to mitigation by a regular schedule of physical exercise similar, in effect, to that on the Mir space station. The beneficial effects were particularly pronounced in the four subjects who were on the exercise regimen throughout the period of simulated weightlessness; they were less so in the five subjects whose exercise program was delayed for 120 days. The former group, for example, remained free of syncopal episodes, while the latter group did not. References 7 (Russian)

UDC 616.5-008.953.6-02:612.273.2]-092.9-07

Correlation Analysis of Skin Basophil Responsiveness to Exogenous Hypoxia in Rats

907C0423H Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 86-88

[Article by V. M. Kirzhner, A. N. Kordenko and I. B. Ushakov]

[Abstract] Skin basophils were examined for their utility as indicators of individual tolerance of exogenous hypoxia; albino rats were exposed to a gas mixture of 92 percent nitrogen and 8 percent oxygen for 8 min. Histologic criteria were used to classify the basophils into six types. Paired correlation analysis revealed that, although fundamental correlations were maintained between secretory and nonsecretory forms, the hypoxic episode led to a reduction in the correlation coefficients between

certain subtypes. In addition, the observed trends correlated with control counts before hypoxia: types with high counts were reduced, and vice versa. Figures 2; References 1 (Russian).

UDC 616.124..2/.3-092:612.014.49]-02:612.014.477]-092.9-07

Effect of G Forces on Ca^{2+} Reactivity of Ventricular Actomyosin in Rats

907C0423I Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 88-89

[Article by B. A. Tikunov, M. A. Kayfadzhyan and S. S. Oganesyan]

[Abstract] An analysis of the effects of G forces on the responsiveness of actomyosin to Ca^{2+} was investigated in the case of outbred male rats (160 - 200 g) subjected to +5g acceleration in a centrifuge for 25 min/day for 7 days. Acceleration was shown to enhance Ca^{2+} activated rate of superprecipitation and Mg^{2+} ATPase activity in both ventricles, with, however, more pronounced changes in the left ventricle. Treatment of the animals with propanol in the course of the experiment countered the effects of acceleration. These findings indicate that beta-blockers merit further study as a means of controlling the adverse effects of acceleration on the heart. References 8: 5 Russian, 3 Western.

UDC 616.8-02:616-001.12]-092-07

Neurologic Pathogenesis in Decompression Sickness in Rabbits

907C0423K Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 92-93

[Article by A. B. Korolev]

[Abstract] Pathogenesis in the CNS in the course of decompression was studied on rabbits subjected to a simulated depth equivalent to 11 atm for 30, 40 or 60 min. Visual monitoring of the vascular status of the parietal lobes was conducted via a plastic window inserted into the skull 5 - 7 days before decompression. Venular and arterial spasm became evident immediately after commencing decompression, while bubbling was delayed until decompression was terminated. Bubble formation in the cerebrospinal fluid preceded analogous vascular developments. Recompression when respiration ceased was ineffective as a resuscitative measure, although it led to rapid disappearance of gas bubbles in the veins and marked reduction in the cerebrospinal fluid. Consequently, the key pathogenetic mechanisms consist of a markedly compromised cerebral circulation due to vasospasm, leading to cerebral ischemia, neuronal death, and thrombogenesis with systemic sequelae. References 9: 3 Russian, 6 Western.

UDC 613.693

Reasons For Inflight Deterioration of State of Health in Pilots. Report 2

907C0424B Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 10, Oct 89 pp 43-45

[Article by Lt Col Med Serv V. Ye. Yastrebov, candidate med sciences, and Lt Col Med Serv V. V. Shcherbinskiy]

[Abstract] The paper represents the second part of a report (VOYEN.-MED. ZHURN., 1989, No 4, pp 53-54) on factors underlying inflight deterioration of health in pilots, usually described in the literature as fatigue related to mental and physical stress. Current findings indicate that the physiological changes implicated in this condition are vagotonia, spasmophilia, and functional hypoglycemia. Equally significant is the fact that psychological factors are involved in 55 - 85 percent of the cases, in conjunction with physical stress factors. Although greater insight has been obtained into the pathogenetic mechanisms underlying inflight deterioration of physical and mental faculties, prevention and treatment modalities will have to be placed on a firmer ground through further research to ensure greater flight safety. References 9 (Western).

Possibility of Use of Pulsed Voltage For Pre-Sowing Electrostimulation of Potato

907C0322A Kishinev ELEKTRONNAYA OBRABOTKA MATERIALOV in Russian No 5, Sep-Oct 89 pp 62-63

[Article by T. I. Kulikova, N. A. Kasatkin and Yu. P. Danilov]

[Abstract] Lorkh variety potatoes were subjected to a 4 kV/cm constant electrostatic field and to a 4 kV/cm field with pulsed voltage. Pulse repetition frequency was 100 sec^{-1}, and rate of pulse rise was 10^{-4} sec. Exposure time for each field was 10 sec. The purpose of the research was to study the effect of an electrostatic field and high-voltage pulses on rates of cell fission in cells of the root meristem of the adventitious roots of potatoes. Field experiments performed in 1984-1987 on a 1.5 hectare plot showed that sowing material processed by a pulsed electric field produced shoots 3 - 5 days earlier than unprocessed material. Experimental plants developed more quickly and were leafier. Results of studies at the cellular level confirmed the effectiveness of use of high-voltage pulses together with an electrostatic field and a corona discharge field. The electrostatic field and high-voltage pulses increased the mitotic index in the root meristem cells of the potatoes, and pre-sowing treatment of the tubers by high-voltage pulses is more effective as well as being simpler and safer. Pre-sowing electrostimulation of seed potato ensured a 15 - 17 percent increase of yield. References 9 (Russian).

UDC 579.64:631.46

Formation of Nodules on Roots of Carrots Inoculated by Azospirillae

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 5, Sep-Oct 89 pp 11-16

[Article by Ye. V. Nadkernichnaya, A. Ye. Mamchur and V. I. Lokhova; Ukrainian Scientific Research Institute of Agricultural Microbiology, Chernigov]

[Abstract] A study of the capacity of the *Azospirillum* genus to cause formation of nodules on carrot roots involved application of an aqueous suspension of *Azospirillum brasilense* 21, the titer of which was 10^9 per ml of suspension, to hand-sown carrots at a dosage of 50 ml per linear meter of area planted in carrots. Electron microscopic studies of the nodules that formed showed that their tissue consists of coarse oval cells with a large central vacuole, thin walls and a thin parietal layer of cytoplasm. No pathological changes or bacteria appeared in the conducting root tissues found in the central part of the vacuole. Readily staining polymorphic structures—bacteria—appeared frequently in cells directly adjacent to the intercellular space. Fissile bacteria appeared in those cells. The bacteria pass from one cell to another through breaks in the cell wall. Bacteria appeared also in the intercellular spaces and in the invaginations between the cell membrane and the cell wall and in voluminous cavities obviously of lysigenous origin, confined by the thick cell wall. Associative nitrogen-fixers of *A. brasilense* 21, penetrating the carrot plant roots, can cause formation of nodules which serve as a place of localizing bacteria and are characterized by high nitrogen-fixing activity. Figures 7; References 13: 7 Russian; 6 Western.

UDC 631.86

Associative Strains of Azotobacter Chroococcum For Rhizophil Bacterial Fertilizer

907C0388D Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 5, Sep-Oct 89 pp 639-644

[Article by N. A. Troitskiy, M. A. Novitskaya and T. M. Troitskaya, Institutes of Genetics and Cytology and of Experimental Botany, Belorussian SSR Academy of Sciences, Minsk]

[Abstract] Two novel strains of *Azobacter chroococcum* were derived by breeding for adhesion to tomato and barley roots and were designated T12 and T9, respectively. Both strains were remarkable for their enhanced adhesion to the rhizoplane and enhancement of plant growth and yield. Genetic analysis revealed that both had gained an additional plasmid in comparison with the parental *A. chroococcum K* strain, and that T9 had lost a plasmid present in the progenitor. In addition, biochemical studies showed pattern differences in secretory proteins. Greenhouse and field trials conducted in 1981 - 1986 showed that rhizophil, a peat fertilizer using T12, increased tomato harvests by 31 - 43 percent, with an average of 34.8 percent. Commercial production by the Nesvizhsk Biochemical Plant has found a ready market in Belorussia, with an estimated cost-effectiveness of approximately 3 million rubles per 120 tons of rhizophil. Figures 4; References 25: 13 Russian, 12 Western.

UDC 633.11:631.524.85

Genetic Control of the Resistance to Snow Cover and Frost Resistance in Winter Wheat

907C0427A Moscow DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V.I. LENINA in Russian No 10, Oct 89 pp 2-4

[Article by Ye. A. Kokurina, M. I. Rybakova, Scientific Research Institute of Agriculture of the Central Regions of the Nonchernozem Region]

[Abstract] The fact that some highly frost-resistant varieties of wheat in the Nonchernozem region cannot tolerate snow cover and, conversely, some snow-resistant varieties cannot tolerate frost, led the researchers here to

study the inheritance of those traits in winter wheat. The period of the study consisted of the winters of 1986/1987 and 1987/1988 and involved the diallel crossing of the varieties Zarya, Ulyanovka, Rimpau W. W., Bezostaya I, and Pitikul. Rimpau W. W. and its hybrids were the varieties most resistant to damage under snow cover, whereas Ulyanovka and its hybrids were the most frost-resistant. The Zarya variety was the hardiest. Superdominance was found to prevail in the genetic control of resistance to snow cover and frost. Heavy selection for these traits in the early hybrid generations is not recommended. References 10: 7 Russian, 3 Western.

UDC 577.15.02

Stabilization of A-Chymotrypsin by Reductive Alkylation of Amino Groups by Glyoxylic Acid

907C0388C Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 5, Sep-Oct 89 pp 620-622

[Article by N. S. Melik-Nubarov, V. A. Shikshnis, V. I. Slepnev, V. V. Mozhayev and I. V. Berezin, Moscow State University imeni M. V. Lomonosov; "Ferment" Scientific Production Association, Vilnius]

[Abstract] In order to optimize the use of enzymes in biotechnology, studies were conducted on chemical stabilization of α-chymotrypsin. The enzyme was dissolved in 0.1 M potassium phosphate-0.5 M boric acid buffer, pH 8.4, and treated with glyoxylic acid. Isoelectric focusing of the modified enzyme showed approximately ten bands representing variously modified molecular forms of the enzyme. Inactivation studies over a temperature range of 35 - 85°C, based on comparison of the inactivation rates (K_{in}), revealed marked enhancement of thermostability with the K_{in} ratio of the native to the modified α-chymotrypsin exceeding 1,000. Figures 3; References 19: 10 Russian, 9 Western.

UDC 57.088

Magnetic Carriers For Bioactive Macromolecules

907C0388E Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 5, Sep-Oct 89 pp 645-646

[Article by N. S. Khromov and S. V. Leonov, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Immobilization of macromolecules on magnetic carriers offers many technical advantages in biotechnology, a consideration providing the rationale for the preparation of magnetic polyacrylamide gel (PAG) and Sephadex G-15. Magnetic PAG was prepared by the method of Griffin et al. (APPL. BIOCHEM. BIOTECHNOL., 6: 283, 1961), with analogous procedures applied to the preparation of magnetic Sephadex G-15. Subsequently, donkey antibodies against rabbit IgG were coupled to Sephadex G-15 by the periodate method, and horseradish peroxidase to PAG via glutaraldehyde. Evaluation of the products demonstrated that the enzyme retained 65 - 70 percent of its original activity and the antibody, its binding specificity, with the basic properties of the carriers remaining unaffected. References 11: 1 Russian, 10 Western.

UDC 577.152.1

Elongation Factor Tu of Extremely Thermophilic Hydrogen-Oxidizing Bacterium Calderobacterium Hydrogenophilum

907C0503A Moscow BIOKHIMIYA in Russian Vol 54 No 11, Nov 89 pp 1830-1837

[Article by K. Mikulik, Ch. Huang-Ling, M. A. Pusheva and N. D. Savelyeva; Institute of Microbiology, Czechoslovakian Academy of Sciences, Prague; Institute of Microbiology, USSR Academy of Sciences, Moscow]

[Abstract] The elongation factor Tu (EF-Tu), which participates in protein synthesis and plays an important role in the translation of genetic information in ribosomes, was obtained from the extremely thermophilic hydrogen-oxidizing bacterium *Calderobacterium hydrogenophilum*. Previous work had shown that EF-Tu from the extremely thermophilic bacterium *Thermus thermophilus* differed from Tu from *Escherichia coli* in that an antibody against EF-Tu (*E. coli*) did not interact with EF-Tu (*T. thermophilus*). EF-Tu (*T. thermophilus*) was much more thermostable than EF-Tu (*E. coli*). In this work, the authors studied the molecular and functional properties of EF-Tu (*C. hydrogenophilum*) grown at 50 - 82°C to clarify whether the thermostability of EF-Tu is accompanied by structural changes. It was shown that EF-Tu (*C. hydrogenophilum*) was structurally similar to EF-Tu (*E. coli*); however, it differed from Tu (*E. coli*) in molecular weight and thermostability. EFs from *C. hydrogenophilum* and *E. coli* were found to be immunologically similar. The EF from *C. hydrogenophilum* was functionally interchangeable in EF-Tu-dependent translation of poly(UG) on *E. coli* ribosomes. The obtained data support the hypothesis that EF-Tu thermostability is not associated with major structural changes in the factor. Figures 6; References 29 (Western).

UDC 577.123

Isolation, Purification, and Several Properties of BstN1 Restrictase and Methylase From Bacillus Stearothermophilus

907C0503B Moscow BIOKHIMIYA in Russian Vol 54 No 11, Nov 89 pp 1894-1903

[Article by M. M. Baryshev, Ya. I. Buryanov, V. G. Kosykh and A. A. Bayev; Microorganism Biochemistry and Physiology Institute, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] A new class of restriction-modification enzymes of the second type, DNA-methylases that modify cytosine with the formation of N^4-methylcytosine (m^4C), was recently discovered. This has led scientists to hypothesize that N^4-cytosine-DNA-methylase may be prevalent in thermophilic bacteria. In connection with this, attention has been focused

on the thermophilic bacterium *Bacillus stearothermophilus* in whose DNA m^4C has been detected. This bacterium produces BstN1 restrictase, an isoschizomer of EcoRII restrictase. The goal of this work was to isolate, purify, and characterize BstN1 restrictase and its corresponding DNA-methylase from *B. stearothermophilus*. The authors found that MvaI and BstN1 restriction-modification enzymes exhibited a substrate specificity more precise than EcoRII enzymes in that they were able to identify m^5C in a recognition sequence as opposed to EcoRII system enzymes, which did not differentiate between m^4C and m^5C. This property of corresponding pairs of restrictase and DNA-methylase can be used in analyzing the degree of cytosine methylation in plant DNA. The authors thanked D. Komb for the obtained *B. stearothermophilus* strain and A.A. Yanulaytis and V.V. Butkus for preparing the MvaI restrictase and N^4- methylcytosine (Scientific Production Association "Ferment", Vilnius). Figures 7; Tables 6; References 17: 5 Russian, 12 Western.

UDC 577.112

Primary Venom Factors of Central Asian Cobra Naja Naja Oxiana That Inhibit Complement

907C0503C Moscow BIOKHIMIYA in Russian Vol 54 No 11, Nov 89 pp 1919-1926

[Article by L. V. Kozlov, B. B. Shoybonov and V. K. Antonov; Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] Two anti-complement venom factors of the Central Asian cobra *Naja naja oxiana*, isolated by CM-Sepharose chromatography of the primary fraction of the venom that did not absorb on DEAE-Sepharose, were studied. Of three such factors—CFB-I, CFB-II, and CFB-III—the latter had been characterized earlier. In this work it was shown that CFB-I is a protein with N-terminal aspartic acid and a molecular weight of about 39 kDa (according to gel-chromatography data). Its concentration in the venom was 3.6 mg/g of dry venom. It inhibited, primarily, the classic pathway of complement activation via binding with the C4 component with an inhibition constant of $K_i = 9$ nM. It is possible that CFB-I may be analogous to the CI inhibitor in venom from the *Naja haje* cobra. CFB-II was identified to be the previously described cytotoxin I, based on data on its N-terminal amino acid sequence. It inhibited the formation of C3-convertase with $K_i = 2.2 - 2.8$ μM via binding with C4b and interfering with sorption of the C2 component. Figures 10; Tables 3; References 9: 5 Russian, 4 Western.

UDC 615.373.03:616.154:577.175.328]-078.333

Monoclonal Antibodies to Bovine Prolactin That React With Human Prolactin

907C0603B Moscow PROBLEMY ENDOKRINOLOGII in Russian Vol 36 No 1, Jan-Feb 90 pp 75-78

[Article by R. Fidler, T. A. Osipova, A. L. Grigoryan, I. P. Papazov, M. Sh. Verbitskiy, A. A. Bulatov, Institute of Experimental Endocrinology and Hormone Chemistry of the USSR Academy of Medical Sciences; Human Morphology Scientific Research Institute of the USSR Academy of Medical Sciences]

[Abstract] The purpose of this study was to produce monoclonal antibodies (Mab) to bovine prolactin, describe those antibodies, and study their cross reactivity to the prolactin of other species of animals and man. Highly purified preparations of prolactin from cattle, man, rats, whales, and pigs and human and bovine somatotropin were used. BALB/c mice were immunized three times intraperitoneally with bovine prolactin at four-week intervals to produce a hybridoma. Two stable hybridomas (Mab 1 and Mab 2), the culture of which revealed marked reactivity to the original immunogen, were obtained from hybridization of the splenic cells of mice immunized with bovine prolactin. It was shown that Mab 2 reacted only with bovine prolactin, while Mab 1 reacted to bovine and human prolactin, thus demonstrating that the antibodies differ in their epitope specificity. Mab 1 also reacted with pig, whale, and rat prolactin, but not with human or bovine somatotropin. Mab 1 may serve as the basis for creating immunosorbents that would simplify the procedure for extracting prolactin from human hypophyses, which is very difficult. There are at least two sterically non-overlapping antigenic epitopes, one of which is species specific, and the other being extra-species. Mab 1 may be used for the immunochemical analysis of human prolactin. References 10 (Western).

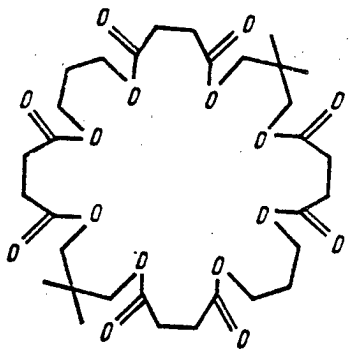
UDC 577.352.22:[577.182.423+547.898]

Reaction of Valinomycin and Crown Ether in Monolayers

907C0505A Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 6 No 11, Nov 89 pp 1222-1226

[Article by I. P. Konup, Ye. I. Nazarov, I. A. Iontov, R. A. Iontova and V. G. Vongay; Department of Biology, Odessa State University imeni I. I. Mechnikov, Odessa]

[Abstract] A cation-dependent change in the surface tension of combined phosphatidylcholine-valinomycin monolayers is discovered with the introduction of a crown ether into the substrate. The effect of cations on surface tension increases in the order $Na^+ < Li^+ < K^+ < Ca^{2+} < Sr^{2+}$. It was established that the cause of the change in surface tension is a cation-dependent reaction of crown ether and valinomycin. These data supported the possibility that binary complexes of the valinomycin-cation-crown ether type formed on the surface of biological membranes. The authors believe that inhibition of valinomycin activity on mitochondrial and synthetic membranes by crown ethers serves as evidence of the formation of binary complexes. In this work, the authors used phosphatidylcholine, valinomycin, and domestically produced reagents. The crown ether (pictured above) was synthesized at the Department of Macroheterocyclic Compound Chemistry, Physical Chemistry Institute imeni A. V. Bogatskiy, Ukrainian SSR Academy of Sciences. The authors recognized the possibility that natural complexones other than valinomycin could also form binary complexes with crown ethers and determined that such a possiblity should be studied in analyzing the mechanism of the crown ethers' physiological activity. Figures 4; References 11: 6 Russian, 5 Western.



UDC 663.18[519.252.5]

Cloning and Expression of Human Proinsulin Gene in B. Subtilis Strains With Lowered Extracellular Proteinase Activities

907C0388A Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 5, Sep-Oct 89 pp 549-554

[Article by A. A. Novikov, Ye. V. Parfenova, D. G. Popov, Yu. V. Yomantas, Yu. I. Kozlov, V. E. Sterkin, O. G. Chakhmakhcheva, V. A. Yefimov and A. Ya. Strongin, All-Union Scientific Research Institute of Genetics and Breeding of Industrial Microorganisms, Moscow]

[Abstract] Technical details are presented for the construction of plasmids for the expression of the human proinsulin gene (HPIG) in *B. subtilis* with low extracellular proteinase activities in order to optimize yield parameters of such systems. The expression of HPIG and protein secretion was engineered to be under the control of the regulatory elements of *B. amyloliquefaciens* α-amylase gene. The recombinant *B. subtilis* cells secreted a 9 kD peptide that reacted in RIA with antibodies directed against the native proinsulin molecule. In control *B. subtilis* strains, the secreted proinsulin is subject to rapid degradation by extracellular proteases, leading to a 2-fold decrease in concentration within 5 - 10 min. However, in strains with low extracellular proteinase activities, the yield of proinsulin was improved 5- to 6-fold to 200 U/ml (1 mg/ml). Figures 3; References 16: 5 Russian, 11 Western.

UDC 663.18:636.087.74

Effect of Certain Organic Compounds on Growth of Methylotrophic Bacteria Methylobacterium MB1

907C0388B Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 5, Sep-Oct 89 pp 559-564

[Article by L. A. Skladnev, Yu. D. Tsygankov, E. V. Kuznetsov, M. V. Bayev, N. I. Govorukhina and Yu. A. Trotsenko, Scientific Research Institute of Genetics and Breeding of Industrial Microorganisms, Moscow]

[Abstract] Methylotrophic bacteria isolated from soil in the Moscow region were identified as *Methylobacterium MB1* and were shown to have a G + C content of 70.0 percent. The effects of various organic compounds were also assessed in order to identify mutants that may be useful in creating a gene bank. The results revealed vitamins that were without effect on solid M9 medium, and that *Methylbacterium MB1* was highly susceptible to rifampicin, tetracycline, streptomycin, and kanamycin. In addition, only two amino acids—threonine and valine (50 μg/ml)—were shown to be inhibitory. Finally, growth of *Methylbacterium MB1* was strongly inhibited by fluorinated pyrimidines and 2-aminopurine. References 15: 5 Russian, 10 Western.

UDC 676.08:579.69:553.32

Possibility of Use of Enzymatic Hydrolysates of Cellulose-Containing Byproducts For Bacterial Leaching of Manganese From Ores

907C0388F Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 5, Sep-Oct 89 pp 647-651

[Article by M. Z. Serebryanaya, A. A. Klesov, Yu. S. Babenko and L. N. Petrova, Dnepropetrovsk State University; Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow]

[Abstract] Trials were conducted on the effects of nutrient medium on the efficiency of *Achromobacter delicatulus 182-A* on the leaching of Mn from various ore samples containing 8.25 - 33.6 percent Mn. The results obtained with glucose were compared with those obtained with enzymatic hydrolysates of cellulose-containing byproducts supplemented with 3 percent glucose. In the final analysis, the results demonstrated that hydrolysates derived from corn stumps exerted a moderate inhibitory effect on the leaching process, while the effects with the hydrolysate derived from cotton stems was essentially comparable to that obtained with the glucose medium. In the latter two cases, the Mn content was reduced from 8.25 to 0.99 percent over a four-day period. Finally, fine cellulose fiber hydrolysate with an admixture of bentonite yielded superior leaching (39 percent recovery) over glucose (13 percent) from psilomelanic ore. Figures 1; References 12: 10 Russian, 2 Western.

UDC 663.1-52

Automation of Biotechnological Processes and Research

907C0388G Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 5, Sep-Oct 89 pp 652-665

[Article by O. G. Shirokov, D. V. Zudin and G. A. Ugodchikov, Scientific Research Center for Research Automation in Physicochemical Biology]

[Abstract] An outline is provided of Soviet and non-Soviet computers and networks dedicated or applied to practical biotechnology and biotechnological research. In tabular form, summary data is provided on Soviet computers and microcalculators, with the former classified into the following categories: mainframe, minicomputers, and microcomputers. Cursory description is also provided on operational schemes for harnessing automation technology to biotechnology, largely derived from Western developments. Finally, the closing comments remark the high cost of computerization, with the conclusion that more extensive use of computer technology cannot but help improve the cost-effectiveness figures. Figures 3; References 81: 57 Russian, 24 Western.

UDC 635.21:577.15

Using Peroxidase and Glutamate Dehydrogenase as Biochemical Markers in Biotechnology Research on Potatoes

907C0427B Moscow DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V.I. LENINA in Russian No 10, Oct 89 pp 14-15

[Article by I. S. Vitol, O. S. Melik-Sarkisov, V. A. Avetisov, I. G. Dubrovskiy, All-Union Scientific Research Institute of Agricultural Biotechnology]

[Abstract] Peroxidase and glutamate dehydrogenase may be used as biochemical markers for the diagnostics and identification of somatic potato hybrids. The development of bioengineering techniques such as somatic hybridization and cellular selection for crop plants makes essential the use of distinct biochemical characteristics of the material that is being researched. The isoenzyme represents one of those characteristics. The authors studied numerous forms of peroxidase and glutamate dehydrogenase from various varieties and wild species of potatoes in culture in vitro, and they explained the nature of their distribution in various organs and callus tissues in order to determine the feasibility of using these enzymes as biochemical markers. Serving as the subjects were test plants of the *Solanum tuberosum* L. of the varieties Domodedovskiy, Izobiliye, Nevskiy, and Yantarnyy; wild species *S. microdontum* Bitt. and *S. demissum* Lindl.; and leaf and root calluses. The researchers found that the distinct varietal differences in the isoenzyme spectra of peroxidase and glutamate dehydrogenase make it possible to use those enzymes as biochemical markers in varietal diagnostics and in studies of somatic hybridization to confirm the hybrid nature of calluses and plants obtained. Figures 3, References 8: 4 Russian, 4 Western.

UDC 577.151.03

Immobilizing Enzymes on Monodisperse Latexes

907C0437A Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 6, Nov-Dec 89 pp 729-734

[Article by V. K. Vanag, V. N. Bakharev, N. L. Yeremeyev, V. A. Livshits, I. A. Gritskova, N. F. Kazanskaya, V. P. Zubov, M. V. Alfinmov, Institute of Chemical Physics, USSR Academy of Sciences, Moscow; Moscow State University; Moscow Institute of Fine Chemical Technology, Moscow]

[Abstract] Knowledge of the structural laws and kinetic characteristics of the binding of enzymes to latex microspheres is essential to the creation of biochemical sensors, medicinal agents, and markers based on monodisperse latexes. The researchers here studied the structural aspects of the immobilization of subtilysine, peroxidase, and glucose oxidase on monodisperse acrolein latex microspheres. In the process, they discuss the synthesis and characteristics of polyacrolein latex particles, enzyme immobilization, and the activity of enzyme preparations. The maximum amount of enzyme capable of binding with the latex was calculated using the relationship of the activity of the immobilized enzymes to the time of immobilization. The high degree of inactivation observed for glucose oxidase is apparently due to its quaternary structure. The activity of the preparations of immobilized enzymes is proportional to the surface area of the microspheres. The actual number of enzyme molecules that bind with one microsphere was calculated to determine whether the enzyme molecules and low-molecular weight substances can penetrate into the microspheres and bind with the carrier. Subtilysine binds first with the surface, and then inside the microsphere if the concentration is high enough. Preparations based on these particles can be used in various fields of bioengineering. The polyacrolein microspheres are a suitable and convenient carrier for enzymes such as peroxidase and subtilysine. Figures 2, References 12: 7 Russian, 5 Western.

UDC 577.15+547.458

New Enzyme Membranes Based on Cellulose

907C0437B Moscow BIOTEKHNOLOGIYA in Russian Vol 5 No 6, Nov-Dec 89 pp 747-748

[Article by D. D. Grinshpan, G. A. Gavenas, G. I. Denis, A. G. Dobrolyubov, S. B. Itsygin, Scientific Research Institute of Physico-Chemical Problems, Belorussian State University imeni V. I. Lenin, Minsk; Scientific Production Association Ferment, Vilnius; All-Union Scientific Research Institute of Antibiotics, Moscow]

[Abstract] The use of permeable polymer membranes with immobilized enzymes as highly selective biocatalysts is of interest to researchers. The methods used to insert the enzyme into the membrane do not enable the creation of enzyme analyzers with an electrode function that lasts for long periods of use. The use of chemically modified cellulose membranes as a polymer carrier capable of covalently bonding enzymes while retaining a large amount of their original activity was suggested. The membranes were produced by dissolution of cellulose in non-aqueous agents, subsequent homogenous esterification, and precipitation in the form of a porous film. The research performed indicated the feasibility of increasing the number of enzymes for the immobilization of which hydrophilic cellulose films are perfectly suitable. References 6 (Russian).

UDC 616.33-006.6-02:614.7]-07

Analysis of Correlation Between Incidence of Stomach Cancer and Anthropogenic Environmental Pollutant Factors

907C0401E Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 89 pp 58-62

[Article by N. S. Kovaleva, V. I. Chissov and V. M. Merabishvili, Moscow Scientific Research Oncological Institute imeni P. A. Gertsen]

[Abstract] An analysis was conducted on the interrelationshp between the incidence of stomach cancer and man-made pollutants in the Nonchernozem Zone of the RSFSR. The study was predicated on the unusually high incidence of stomach cancer in most areas of the zone. In the Kalinin Oblast, for example, the incidence of stomach cancer for men and women is, respectively, 104.8 and 80.1 per 100,000, versus average figures of 44.4 and 32.4 per 100,000 for the USSR. Cluster analyses revealed that regions with a relatively low incidence also had low usage of pesticides and nitrogen fertilizers and low concentrations of benzapyrene in the environment. Basically, this area was represented by the Northwestern Economic Rayon of the RSFSR, where the incidence for men and women was 26.9 - 52.5 and 21.3 - 49.1, respectively. In all cases the positive correlation between the incidence of gastric malignancy and the level of pesticides and benzapyrene in the environment was statistically significant. Figures 5; References 7 (Russian).

UDC 616.127-005.8-036.11-036.8-07(575.1-25)

Acute Myocardial Infarction Morbidity, Mortality, and Lethality in Tashkent

907C0605A Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 62 No 1, Jan 90 pp 23-26

[Article by B. Kh. Makhmudov, F. R. Kadyrova, Scientific Research Institute of Cardiology, UzSSR Ministry of Health]

[Abstract] The acute myocardial infarction (MI) morbidity, mortality, and lethality in Tashkent were studied. Research was conducted from 1 July 1981 to 31 June 1983 in an administrative rayon of the city with a population of more than 200,000. The study was performed in a program called "Acute Myocardial Infarction Register," which recorded new cases of MI among the population aged 20 - 65. A total of 131 cases were recorded in the first year of the study, 141 in the second year. Cases of sudden death due to heart attacks were higher in January and February and between 6 AM and 12 noon. The morbidity rates for acute MI among the Tashkent population studied were 1.98 and 1.96 for men per 1,000 and 0.44 and 0.62 for women per 1,000 for the first and second years of the study, respectively. The mortality rate for acute MI and acute coronary insufficiency was 58.6 and 52.3 per 100,000 (irrespective of gender) for the first and second years of the study, respectively. Acute MI lethality (the ratio of those who succumb to a disease or condition to those who survive it) is high, at 49.6 percent and 41.1 percent for the two years of the study. For those two years, pre-hospital deaths accounted for 67.7 percent and 63.8 percent in its structure. Sudden death associated with IHD accounted for 67.5 percent in the structure of lethality. References 2 (Russian).

UDC 576.31.32

Study of Genome Structure of Agropyron Intermedium (Host) Beauv

907C0325A Kiev TSITOLOGIYA I GENETIKA in Russian Vol 23 No 5, Sep-Oct 89 pp 15-22

[Article by Kh. S. Ayzatulina, G. L. Yachevskaya and T. P. Pereladova; Institute of Agricultural Biotechnology, Moscow]

[Abstract] In identifying chromosomes of wheat grass from a representation of the distribution of heterochromatin and studying the features of conjugation of the chromosomes in meiosis, researchers used clone 7/1 from a Caucasus population of Agropyron intermedium (Host) Beauv. They employed differential staining to study the distribution of heterochromatic segments in mitotic segments of the wheat grass. S-segmentation representation provided complete identification of wheat grass chromosomes and showed the interpopulation polymorphism of chromosomes in the wheat grass chromosomes. Three subgenomes were isolated in the wheat grass genome. Study of meiotic conjugation of wheat grass chromosomes showed the presence of quadrivalents, single hexavalents and heptavalents and typical translocation crosses. The study confirmed the similarity of two subgenomes and the presence of translocations in the wheat grass genome. Figures 5; References 18: 6 Russian; 12 Western.

UDC 577.214.622

Molecular Description of Family of Chalcone Synthetase Genes of Tetraploid Strain of Cotton Gossypium Hirsutum 108 F

907C0565A Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 311 No 3, Mar 90 pp 742-744

[Article by M. V. Byzova, A. S. Krayev, K. G. Skryabin, Molecular Biology Institute imeni V. A. Engelgardt, USSR Academy of Sciences]

[Abstract] Chalcone synthetase is an enzyme that plays a central role in the biosynthesis of all classes of flavonoids in plant tissues. It catalyzes the condensation of three molecules of malonyl-CoA with one molecule of *p*-coumaroyl-CoA, producing naringenin chalcone. Flavonoids participate in the biosynthesis of vegetative pigments and in compounds that protect the plants from damage from ultraviolent light and various pathogens. Chalcone synthetase genes are cloned from several species of plants, but obvious mechanisms in the organization of the genes studied have not yet been found. The regulatory elements of light sensitive tissue-specific genes, including chalcone synthetase, are widely used in the expression of alien genes in plants. The cDNA of chalcone synthetase from the common snapdragon (*Antirrhinum majus*) was used to characterize the molecular organization of similar genes of the tetraploid strain of cotton *Gossypium hirsutum* 108 F. Fragments of *Antirrhinum majus* cDNA that were cloned in the M13mp10 phage vector that contained the first and second exons (probe 1) and third exon (probe 2) of the chalcone synthetase gene were used. There were three different sequences in the cotton genome similar to the chalcone synthetase gene. Individual fragments of DNA from the genome library were cloned, and two of the three clones obtained were selected for further research. A genome clone with an active chalcone synthetase gene was produced. There are at least three types of chalcone synthetase nucleotide sequences in the genome of tetraploid *G. hirsutum* 108 F. Figures 3, References 11: 1 Russian, 10 Western.

UDC 576.851.155:633.31

Transduction of Rhizobium Meliloti Genes Labeled With Tn5 Using Phage φ M12

907C0570A Moscow GENETIKA in Russian Vol 25 No 12, Dec 89 pp 2121-2125

[Article by N. I. Novikova, O. N. Chesnokova, V. I. Safronova, L. A. Sharypova, B. V. Simarov, All-Union Agricultural Microbiology Scientific Research Institute, Leningrad]

[Abstract] The possibility of transduction of genes from strain CXM1 of *Rhizobium meliloti* labeled with Tn5 using the phage φ M12 was assessed and proof of the transposable nature of the mutants obtained was presented. In order to determine the nature of the transductants obtained, the phagolysates obtained from ten CXM1 strain transductants were analyzed for their ability to lyse recipient strain CXM1-19. Three of them produced active phage particles. Recombinants of strain CXM1 incorporate both the donor DNA and the bacteriophage DNA during transduction using phage φ M12. Four of the five auxotrophs studied lost their prototrophicity as a result of the inclusion of transposon Tn5 in their genome. Phage φ M12 can perform common transduction of CXM1 mutants. The fact that most of the transposants are true Tn5 mutants indicates the possibility of further labeling by the Tn5 transposon of the genes responsible for symbiosis, including genes that control the economically valuable traits of symbiotic bacteria. Figure 1, References 12: 6 Russian, 6 Western.

UDC 575.153:581.146.6

Modifying Effect of Foreign Cytoplasm on Callus Induction and Growth in Alloplasmic Wheat Lines

907C0570B Moscow GENETIKA in Russian Vol 25 No 12, Dec 89 pp 2168-2175

[Article by P. A. Orlov, A. N. Palilova, Genetics and Cytology Institute, BSSR Academy of Sciences]

[Abstract] The effect of 18 foreign cytoplasms on the expression of traits of callus induction and growth and

formation of roots by the callus in soft wheat was studied. Alloplasmic soft wheat lines with the nuclear genome of *Triticum aestivum* and the cytoplasm of several species of soft wheat were used. The effects of foreign cytoplasm on the growth of calluses induced from various tissues varied in a number of cases. It is noteworthy that the different tissues of the alloplasmic wheats varied in their effectiveness of inducing a callus, with a mature germ being more effective than a young leaf, which was more effective than young spicules. In raw material weight of the callus, young spicules dominated, followed by a mature germ, and then by young leaves. By percent of calluses with rhizogenesis, it was young leaves that were predominate, followed by young spicules, and then mature germs. Some of the foreign cytoplasms stimulated callus formation and rhizogenesis, while others inhibited them. The effect of the cytoplasm with respect to calluses from various tissues differed in a number of cases. Differences among the alloplasmic lines in terms of the induction and development of a callus depending on the type of tissue may indirectly indicate the tissue heterogenicity using cytoplasmic genetic systems or the lesser ability of the plasmon to de-differentiation in comparison with the genome. Foreign cytoplasms have a substantial modifying effect on the expression of traits of callus induction and growth in soft wheat. The cytoplasms of *Agr. aegilopoides, T. spelta,* and *Ae. juvenalis* have a positive effect on induction and growth; *Ae. sharonensis* and *Ae. cylindrica* inhibit those processes. Use of the techniques of differential indices and cluster analysis made it possible to classify the cytoplasms studied by the effect of the parameters studied into five groups. Figure 1, References 16: 5 Russian, 11 Western.

UDC 615.373:578.245].03:616.9-022.7

Interferon Preparations in Complex Therapy For Bacterial Infections

907C0303B Moscow ANTIBIOTIKI I KHIMIOTERAPIYA in Russian Vol 34 No 9, Sep 89 pp 691-696

[Article by V. P. Kuznetsov, D. L. Belyayev, A. A. Babayants, I. Tugutova, V. S. Zuyeva, L. B. Volkova, R. M. Khusainov, I. S. Frolova, and L. A. Zuyeva, Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] Results of the study of a new injectable, alpha-interferon leukinferon, were presented and discussed. Leukinferon is the first medicinal form consisting of a complex preparation of alpha-interferon (10,000 IU in an ampule) and cytokines, produced by induced leukocytes in the process of alpha-interferon production. Recently, efforts were concentrated on development of a new strategy for purification of alpha-interferon which would preserve, in medicinal form, the entire spectrum of lymphokines and other biologically active substances found in the initial native preparation. Such a strategy was developed by using highly-specific negative immunoabsorption methods. Development required many years of work. Leukinferon activated many infection immunity reactions. It, with other means of antibacteria therapy, promoted more rapid elimination of the focus of infection and emergence of the patient from the immunodeficit state. Since the mechanism of its therapeutic effect is associated mainly with the immunocorrecting action, use of leukinferon is indicated for practically any infectious process. The preparation was used to treat sepsis caused by gram-negative organisms; 52 children with acute pneumonia complicated by exudative purulent pleuritis with obstructive syndrome and toxicosis were also treated. Leukinferon was also used to treat severe pneumonias in the management of legionnaires disease, pulmonary tuberculosis, chronic, non-specifc pulmonary diseases, and purulent infections of the eyes after antibiotics were ineffective. It was also used in the prevention of development of bacterial complications and in the prevention of postpartum complications in high-risk childbirth. Immunological mechanisms of the therapeutic effect of leukinferon were tabulated and discussed. Figures 1; References 29: 24 Russian; 5 Western.

UDC 616.155.392.2-036.11-053.2-085.339:578.245]-036.3-07

Results of Use of Human Leukocytic Interferon in Program of Treatment of Acute Lymphoblastic Leukemia in Children

907C0326A Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian Vol 34 No 9, Sep 89 pp 33-36

[Article by Professor L. A. Makhonova, I. Ye. Gavrilova, S. A. Mayakova et al., Scientific Research Institute of Clinical Oncology, All-Union Oncologic Scientific Center, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study of the role of a Soviet injection preparation of human leukocytic interferon in a program of treatment of acute lymphoblastic leukemia in children involved observation of 175 children (95 boys, 80 girls) ranging in age from 15 months to 14.5 years with diagnosis confirmed. Of these patients, 71.4 percent were at high risk. One group (112 children) received interferon injections at different stages of the treatment program, and the other (63) did not. Injection of human leukocytic interferon produced a direct antitumor effect in the 112 children. The effect was manifested by a decrease of absolute number of leukemia cells in the peripheral blood and bone marrow, of tumoral infiltration of the spleen, liver and lymph nodes. The drug increased effectiveness of inductive chemotherapy, shown by onset of complete remission that came earlier in children not receiving the drug. The duration of remission and survival rate of the patients (most of whom were at high risk) increased. The drug also activated the natural and antitumoral resistance of the body. References 9: 4 Russian; 5 Western.

UDC 615.277.3:546.92].015.46:612.017.1

Immune Activity of Platinum Coordination Compounds Complexed With Immunoglobulin Fragments

907C0416D Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 9, Sep 89 pp 313-315

[Article by V. M. Plotnikov, S. A. Kazakov and V. G. Merkulov, Scientific Research Institute of Oncology, Tomsk Scientific Center, USSR Academy of Medical Sciences; Novosibirsk Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences]

[Abstract] In vitro and in vivo studies were conducted to determine whether conjugating Pt antineoplastics to Fab fragments of human IgG would mitigate their general toxicity. The data showed that cis-DDP and dichloro-N,N,N,N-tetracis-2(aminoethyl)-1,6-hexamethylenediaminobisplatinum dichloride (Pt_2AmCl_4, I) suppressed in vitro blast transformation of human lymphocytes induced by PHA, whereas complexes of the respective compounds with Fab fragments were virtually devoid of antiproliferative activity. In a number of experiments, blast transformation was actually enhanced 20 - 45 percent by the I conjugate. In vivo studies on BALB/c mice treated intraperitoneally with 10 mg/kg of the Pt compounds revealed a short-term (2- to 3-day) leukopenia (35 - 54 percent). Injection of the conjugates was not accompanied by leukopenia. The data demonstrated that conjugation of Pt antineoplastics mitigates their toxicity and, in the case of the novel I compound, may lead to immunostimulation. References 6: 5 Russian, 1 Western.

UDC 615.373.015.46.07

Pharmacodynamics of Antibodies Against Choline Receptors

907C0416E Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 9, Sep 89 pp 320-322

[Article by G. V. Burlakov, Chair of Pathological Physiology, Second Moscow Order of Lenin State Medical Institute imeni N. I. Pirogov]

[Abstract] Rabbit antibodies generated against motor-denervated skeletal muscles of BALB/c mice were shown to contain antibodies against acetylcholine receptors in a test involving the medicinal leech *Hirudo medicinalis.* Specifically, preincubation of a smooth spinal muscle preparation of the leech with the rabbit antiserum rendered the muscle refractory to acetylcholine. This study also served to demonstrate the lack of species specificity of acetylcholine receptors. Figures 2; References 11: 1 Russian, 10 Western.

UDC617-001.4-085.362.112.94.017.1.063-036.8

Lymphokine Therapy of Experimental Wounds

907C0416F Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 9, Sep 89 pp 340-342

[Article by L. V. Kovalchuk, B. Bayart and L. V. Gankovskaya, Chair of Immunology, Second Moscow Medical Institute imeni N. I. Pirogov]

[Abstract] Therapeutic trials were conducted with supernatants and lymphokine fractions (20 - 30 kD and 60 - 70 kD) derived from autologous PHA-activated lymphocytes in managing 400 mm^2 musculocutaneous wounds on outbred rabbits. Treatment of the wounds with the lymphokine fractions and supernatant of activated cells resulted in healing in 17.4 - 18.5 days, whereas a healing time of 32.2 days was obtained with supernatant from non-stimulated lymphocytes. Histologic examinations revealed that the concentration of mononuclear cells in the lymphokine-treated wounds increased two- to three-fold over that in control wounds. Supernatants obtained from PHA-treated lymphocytes that were subsequently incubated with cyclosporin A failed to promote wound healing. These observations confirmed lymphokine involvement in wound healing, presumably through direct effects on fibroblasts and phagocytes. Figures 3; References 11: 6 Russian, 5 Western.

UDC 616.137.83-004.6-007.272-089:615.849.19

Endovascular Angioplasty With Excimer Laser

907C0374A Moscow KHIRURGIYA in Russian No 9, Sep 89 pp 137-138

[Article by A. M. Prokhorov, A. V. Pokrovskiy, Yu. D. Volynskiy, V. I. Konov, M. Ye. Sargin, V. V. Goloma, A. S. Silenok, D. F. Beloyartsev, M. V. Puretskiy, S. K. Vartapetov, Division of Vascular Surgery, Division of Contrast and Intracardial Techniques of X-Ray Research, Institute of Surgery imeni A. V. Vishnevskiy, Institute of General Physics, Moscow]

[Abstract] Earlier studies that used pulsed excimer UV laser radiation ($\lambda = 308$ nm) on an atherosclerotic arterial wall demonstrated that the technique could be used for treating arterial occlusions. This paper represents the first observation of the use of the technique in a human subject—the opening of an atherosclerotic occlusion of the superficial femoral artery. The patient had presented with the complaint of a pain in the lower right leg after 50 minutes of walking. Over a four-year period, the distance the individual could walk without pain had become gradually shorter. Blood pressure, O_2 tension, and plethysmography readings, which were low on the right side, improved markedly after the surgery. Six days after the laser treatment, the patient was transferred to outpatient status, with no signs of claudication. The use of lasers to treat diseases such as atherosclerosis is quite promising as an alternative to operations to correct hemodynamic abnormalities when arterial vessels are occluded. Further careful study and development of laser angioplasty is needed in spite of the undoubted advantages of this technique. References 15: 5 Russian, 10 Western.

UDC 616.7-009.115.085.849.19+615.814.1

Morphological Substantiation For Using Laser Acupuncture in Myopathies

907C0374B Kiev VRACHEBNOYE DELO in Russian No 10, Oct 89 pp 94-96

[Article by B. A. Nikityuk, N. G. Samoylov, Central Institute of Physical Education, Kharkov Pedagogical Institute]

[Abstract] Changes that occur in muscle tissue due to hypoxia, starvation, electrolyte imbalance, hypokinesia, infections, and other toxic conditions may be similar. Serious morphological abnormalities occur in muscle tissue due to hypokinesia. The effect of laser rays on changes in muscle tissue in conditions of prolonged hypokinesia was studied in 4-month-old male rats. A helium-neon laser operating at $\lambda = 632.8$ nm with a power output of 25 mW/cm^2 was used to irradiate acupuncture points—khe-ry and tszu-san-li, which correspond to the fourth point of the meridian for the large intestine and the 36th point on the meridian for the stomach in humans. Exposure time was 15 seconds. The laser acupuncture sharply reduced the number of pathologic lesions in the muscles due to hypokinesia from 45 percent to 7 percent; it slowed degenerative processes, increased microcirculation, and promoted regeneration. Laser acupuncture performs a structure-saving role and hastens the restorative processes in the muscles, thereby decreasing the serious consequences of lack of movement in paralyzed and bed-ridden patients and others. References 4 (Russian).

UDC 616.379-008.64-06:617.586-002.2/.4-089:615.849.19.03

Using CO_2 Laser in Treatment of Pyonecrotic Lesions of Foot in Patients With Diabetes Mellitus

907C0374C Moscow KHIRURGIYA in Russian No 10, Oct 89 pp 71-74

[Article by E. V. Danilyants, A. D. Khazin, S. B. Smakov, V. K.Gorev, City Clinical Hospital No 20, Moscow]

[Abstract] The advantages of using the laser scalpel in treating pyonecrotic lesions of the foot in diabetics included the opportunity of performing sparing necrectomies. Along with other common methods oftreatment, a laser ray was used to save the functions of the lower limb and stop the pathological process of a pyonecrotic lesion in diabetics. The laser device Skal'pel'-1 was used to treat 138 men and women with gangrene in their lower limbs with the purpose of reducing or stopping resorption of toxins from the necrotic tissue and decreasing the degree of intoxication at the pyonecrotic site by step-by-step necrectomies. Laser necrectomy is most effective in the early stages of gangrene. Tables 1, References 8 (Russian).

UDC 617-001.32-008.6-085.849.19

Infrared Laser Restorative Therapy For Prolonged Crush Syndrome at the Emergency Care Facility

907C0401A Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 89 pp 8-10

[Article by V. P. Lapshin, G. D. Litvin, A. I. Ishmukhametov, P. P. Golikov, G. A. Panchenko, G. I. Tseplyayeva, V. A. Buylin, S. V. Gusev and I. Yu. Monayenkova, Scientific Research Institutes of Emergency Medicine imeni N. V. Sklifosovskiy and of Laser Surgery, USSR Ministry of Health, Moscow]

[Abstract] Early use of infrared laser therapy for prolonged crush syndrome was evaluated in the management of 34 patients. The intention was to design rehabilitation that could be implemented at the earliest possible stages without involving physical exertion. Respiratory monitoring provided unequivocal evidence that the use of infrared lasers (0.89 nm wavelength, 2 mW power output) directed at acupuncture points of the

cardiac and pulmonary meridians led to normalization of respiration, central hemodynamics, and reduction of blood fibrinogen. Additional measures that may be used in conjunction with infrared laser therapy are vibromassage and acupuncture. References 3 (Russian).

UDC 577.391.611.8.621.375.8

Factor Model of Quantitative Ultrastructural Changes in Presynaptic Endings Exposed to Low-Intensity Laser Radiation

907C0420G Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 680-685

[Article by D. A. Rusakov and G. G. Skibo, Dnepropetrovsk State University; Institute of Physiology imeni A. A. Bogomolets, Ukrainian SSR Academy of Sciences, Kiev]

[Abstract] Spinal cord segment L_6 of male and female cats (3.0 - 4.5 kg) was irradiated with helium-neon laser light (20 - 30 min, 1 - 3 J/cm^2 at 1.5 - 2.5 mm depth) to obtain additional data on the physiological consequences of therapeutic lasers. Analysis of the dorsal roots in terms of a factor model demonstrated that the radius of presynaptic endings increased by 9.3 percent and the volume by 31 percent. The increase in synaptic vesicles was on the order of 11.6 percent. On the whole, the study provided evidence that the sequelae were basically localized in nature and nonpathologic. The increase in volume was not due to changes in the plasmalemma or changes in the configuration of the terminal elements, but evidently involved metabolic changes in the endings. Figures 2; References 14: 12 Russian, 2 Western.

UDC 616.831-005.4-085.849.19.032.14-036.8-07

Doses of Low-Energy Laser Radiation in Acute Disturbances of Cranial Circulation

907C0606A Moscow KLINICHESKAYA MEDITSINA in Russian Vol 68 No 1, Jan 90 pp 57-60

[Article by V. G. Kukes, I. A. Steblyukova, T. V. Kozlova, R. P. Knyazev, N. B. Khayretdinova, Department of Clinical Pharmacology, First Moscow Medical Institute imeni I. M. Sechenov]

[Abstract] The clinical effectiveness of intravenous laser therapy in patients with an acute disturbance of cranial circulation and the feasibility of determining the criteria for selecting the optimal individual dose were studied. Ninety-three patients with an acute disturbance of cranial circulation were treated with laser therapy, vasodilators and microcirculation drugs. The effect of 2 - 5 mW of laser energy begins with the first dose approximately 30 minutes after the beginning of the procedure (which lasted 30 - 90 min) and reaches its peak by 45 minutes. The activity of the radiation lasts 4 - 24 hours after the procedure ends, depending on the parameters used. Laser treatment for 45 minutes results in a 40 - 50 percent reduction in thrombocyte aggregation. The activity of laser therapy with respect to thrombocyte aggregation lasted 1 day, while the functional activity of the thrombocytes gradually increased. The average optimal dose of laser radiation following an acute insult is in the range of 2 - 5 mW for 45 minutes. References 8: 6 Russian, 2 Western.

UDC 616.24-036.12-085.849.19-036.8

Effectiveness of Using Semiconductor Laser in Comprehensive Treatment of Patients With Obstructive Forms of Chronic Non-Specific Lung Diseases

907C0606B Moscow KLINICHESKAYA MEDITSINA in Russian Vol 68 No 1, Jan 90 pp 66-69

[Article by I. P. Zamotayev, L. I. Mamontova, L. I. Zavolovskaya, Department of Therapy No 2, Central Order of Lenin Institute for Advanced Training of Physicians]

[Abstract] The effectiveness of laser acupuncture treatment of patients with obstructive forms of chronic non-specific lung diseases was studied using the Uzor helium-arsenide unit to generate light with a 890 nm wavelength. Thirty patients with bronchial asthma and chronic obstructive bronchitis were treated with laser acupuncture following antibiotic therapy. Laser acupuncture on so-called biologically active points (acupuncture points) has a therapeutic effect in treating patients with chronic obstructive diseases of the lungs, as is indicated by the increase in lung volumes and improvement in bronchial conductivity. Laser acupuncture alters the functional condition of the adrenoreceptors in the bronchi of bronchial asthma patients. The increase in the partial pressure of oxygen in capillary blood after five and ten laser acupuncture sessions demonstrates a decrease in arterial hypoxemia. Patients note a decrease in dyspnea and coughing, improvement in ease of expectoration, an increase in appetite, and improvement in sleep and mood from the very beginning of treatment. Figure 1, References 17: 16 Russian, 1 Western.

Conductometric Diagnostic Instrument Developed

907C0064C Moscow VECHERNYAYA MOSKVA in Russian 12 Aug 89 p 4

[Article by V. Kucherenko, under the rubric "Perestroyka: The Quality of Medicine: "The Story of One Sensation"; first paragraph is source introduction]

[Text] **There was a sensational report in early August that two Muskovites—Candidate of Medical Sciences V. Tsvetkov and engineer V. Bashlykov—had created an instrument unlike any other in the world. In a quarter of an hour, the instrument can diagnose virtually any serious illness—even in its earliest stage. Our readers asked for more details about it. And so it was that I went to the home of one of the inventors, Vladimir Semenovich Tsvetkov.**

I must admit that I expected to see something unusual. The ARIK-01, which in the words of the inventors could do everything, would fit inside the housing of an ordinary Spidola receiver.

"Well-known principles are utilized here," said Vladimir Semenovich. "Even a child knows that microbes are the cause of many diseases. Entering the human body, they release the products of their vital activities—antigens. In turn, the human body, defending itself, generates an antidote—antibodies, which react with the antigens to neutralize them."

"At the same time, chemists and physicists have long been using conductometers—instruments that measure fluctuations of electrical conductivity and the electrical resistivity of fluids in which chemical reactions are occurring.

"And so we decided to utilize sensitive conductometers to detect reactions between antigens and antibodies.

"Just one analysis is sufficient for a patient. It's not important what kind of analysis it is—blood, urine or saliva. After that, the sample is diluted, and antibodies are added to it—antibodies to identify tuberculosis, salmonellosis, or, for example, dysentery, depending on the test. The electrodes of the apparatus are placed in the test tube simultaneously. And if a reaction begins in the test tube, the ARIK immediately records the result on paper tape.

"Almost all serious diseases may be diagnosed in this way, even cancer. And last year, we tried testing a control preparation for AIDS—it worked!

"What are the advantages of the new method in comparison with what is available today? First, speed. Second, high accuracy. Mistakes by medical personnel are precluded. A sample may be diluted a million times, and still the diagnosis will be accurate. It is a guarantee that the disease can be detected at its very inception, and that effective treatment could be started. Third, economy. The new method makes use of imported test preparations currently employed in medicine, true, but in very small quantities.

"And fourth, the method is completely safe for the patient. You see, it enables a diagnosis with urine or saliva, meaning that the subject's blood need not be sampled. These days, with AIDS becoming a menacing reality, and with disposable syringes scarce, that advantage can be critical. Transmission of infection by poorly sterilized instruments is completely precluded at anonymous diagnostic stations. Wide use of the apparatus would help to save millions of disposable syringes. The other day, the USSR Ministry of Health's Committee for AIDS Control appealed to all who could to contribute their hard currency for the purchase of such syringes. But perhaps it might be better to seek reserves—like the ARIK?"

The possibilities of the instrument are considerable. The inventors have already found ways of making an early diagnosis of cardiovascular diseases that have taken thousands of lives. Further research is required in that area. In principle, with the right electrodes, the ARIK could also be used as a nitrate meter. That would seem to be a monumental discovery for our health care sector. But they didn't notice it right away. Why not? Let me tell the story as it happened, from the very beginning.

It was four years ago that the doctor and the engineer began collaborating. The Central Institute for Postgraduate Medicine (TsOLIUV), where V. Tsvetkov worked, asked the Medical Equipment Testing Institute (the VNIIIMT), where engineer V. Bashlykov worked, to design an instrument by which to assess patient condition. And so an inter-institute work group containing the future coauthors was created.

The inventors quickly found an original solution to the problem, and they assembled an experimental model of the instrument. By as early as 1986, the success of laboratory and clinical tests of the new method was confirmed by the signature of TsOLIUV's prorector for scientific work, B. Shevrygin. That, it would seem, was a triumph.

But the research results were met with clear disbelief by Vladimir Semenovich's associates. They seemed quite improbable to them. Moreover, there was no one to turn to—neither the Americans nor the Japanese had any such apparatus. And although the validity of the conclusions of the inventors had been confirmed by experiments and had been documented, the management of VNIIIMT decided to halt further work, and to disband the research group. USSR Academy of Medical Sciences Academician K. Kashkin, who was the rector of the TsOLIUV at that time, did not support the inventors, either. Soon after that, Vladimir Semenovich left the institute because of friction between him and his superiors on the matter.

But the work went on—unrecognized and unfunded, taking up all holidays and days off. The inventors wrote

letters to the State Committee for Science and Technology, to the Ministry of Health, and elsewhere.

Last spring, it seems, they began to see "light at the end of the tunnel". The two friends read in the journal KHIMIYA I ZHIZN of a competition announced by the USSR Academy of Medical Sciences on promising developments. They decided to enter—and they were successful!

Vladimir Semenovich handed me a copy of a document sent to the VNIIIMT on 6 April 1988. The expert council on molecular biology of the Presidium of the Academy of Medical Sciences granted 65,000 rubles to continue the work.

"What science officials probably fear the most," said V. Tsvetkov, with a bitter laugh, "is the self-interest of inventors. That's why, according to the terms of the competition, the money was given not to us, but to the VNIIIMT, where V. Bashlykov was still working. I had already retired by that time. The institute management used the money in its own way. We managed to get a sum total of 600 rubles from it. God knows where the rest went."

There was but one course of action—to protect the invention with an inventor's certificate, and if things went right, to patent it. After all, such an apparatus could be developed abroad today or tomorrow, and then our country would have to purchase it for hard currency. Several years' work was in danger of going down the drain. However, two claims submitted by Tsvetkov and Bashlykov to the All-Union Scientific Research Institute of Patent Expertise (VNIIGPE) became entangled in red tape.

Could it be that authoritative confirmation of the validity of the claim was lacking? No, the inventors had positive responses from the Saratov Medical Institute, TsOLIUV, and the Biotekhnologiya Scientific Production Association.

An article in IZVESTIYA turned everything around. Now the telephone in V. Tsvetkov's apartment won't stop ringing. People are calling from all corners of the country with proposals to place the ARIK in production. Moscow cooperatives are excited. Four joint ventures are interested as well. One of them is a Soviet-British-American venture.

"The main thing now," Vladimir Semenovich feels, "is to maintain our priority. This is why I was happy to get a telephone call from the State Committee for Science and Technology. They promised to help us patent the ARIK. If the committee keeps its word, great prospects will open up for our brainchild, and that's at the international level, too."

This should be a time for joy, but in my heart I feel unsettled. One thing is clear—we need a new law on inventions. There's no time to waste. We shouldn't have to be lagging behind all the time in the scientific and technical revolution!

UDC 617.001.32-02:550.348.436]-072.7

Functional Examinations of Armenian Earthquake Victims With Crush Syndrome

907C0401B Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 89 pp 12-14

[Article by A. I. Ishmukhametov, T. I. Ilnitskaya and G. I. Tseplyayeva, Scientific Research Institute of Emergency Medicine imeni N. V. Sklifosovskiy, Moscow]

[Abstract] An assessment was conducted on the utility of functional examination in 27 patients with crush syndrome, all victims of the Armenian earthquake, in the emergency room setting. The patients presented with marked traumatic toxicosis due to acute renal insufficiency. The study included assessment of rheoplethysmography, hepatic and renal radiography, and soft-tissue scintigraphy with ^{99m}Tc-pyrophosphate. The clinical outcome demonstrated that functional monitoring of this type provided more accurate diagnostic indicators for therapeutic interventions and permitted more definitive assessment of patient response to therapy. References 2 (Russian).

UDC 617-001.32-008.6-06:616.61-008.64-036.11

Onset and Combination Therapy of Acute Renal Failure in Crush Syndrome

907C0401C Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 89 pp 22-26

[Article by I. I. Shimanko, Scientific Research Institute of Emergency Medicine imeni N. V. Sklifosovskiy, Moscow]

[Abstract] Review of 225 crush syndrome cases and 220 position compression cases demonstrated that the best clinical results are obtained when therapy is adjusted on a daily basis, depending on clinical chemistries and radiographic lung assessment. The most effective means of detoxication is offered by hemodiafiltration, as well as plasmapheresis and hemosorption. In addition, hyperbaric oxygenation has also been shown to be a key component in the multimodal therapeutic regimen, in conjunction with measures that maintain homeostasis. References 9 (Russian).

UDC 616-099-02:615.285.7]-085.38.015.2:615.246.2]-036.8

Malathion Pharmacokinetics in Adsorption Detoxication

907C0401F Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 89 pp 96-99

[Article by Ye. A. Luzhnikov, V. N. Dagayev, Yu. S. Goldfarb, E. E. Gorin, A. N. Yelkov, B. K. Yakhyayev and A. A. Ibragimov, All-Union Center for the Treatment of Acute Poisoning; Scientific Research Institute of Emergency Medicine imeni N. V. Sklifosovskiy, Moscow]

[Abstract] Pharmacokinetics studies were conducted in 390 cases of malathion poisoning to compare the results obtained with hemosorption detoxication and conventional means of management. In the conventionally treated group, the mean level of malathion at the time of presentation was 0.35 μg/ml of blood in the surviving patients, and 2.28 μg/ml in those that succumbed. The corresponding $T_{1/2}$ values for these two groups were 25.55 and 40.58 h. In the hemosorption cohort, the initial blood values in surviving and succumbing patients were 0.55 and 1.49 μg/ml, respectively. The corresponding $T_{1/2}$ values were 16.42 and 14.68 h. In effect, hemosorption served to raise the CL_{50} from 0.45 to 1.89 μg/ml of blood. Hemosorption was thus shown to be an effective measure for limiting malathion toxicity. Figures 1; References 9: 7 Russian, 2 Western.

UDC 614.2:725.511:355]:681.3(47+57)

Computerized Hospital-Based System For Collection and Processing of Medical Data

907C0424A Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 10, Oct 89 pp 7-9

[Article by Maj Gen Med Serv N. L. Krylov, KaSSR meritorious physician and candidate med sciences, Col Med Serv G. N. Dyadyk, candidate med sciences, and Col A. I. Grigoryev, candidate technical sciences]

[Abstract] Brief description is provided of the ASSOMI data management system designed to process patient information at hospitals. The disease classification in the system encompasses some 10,000 entities, based essentially on the 9th (1980) edition of International Classification and Diseases. The system facilitates efficient patient management and hospital administration through up-to-date clinical data and allocation of hospital resources. Reliability of the system is assured by the use of two computers, YeS-1045 and YeS-1046, in case there is hardware failure, as well as by other technical measures taken to protect the files and software.

UDC 616-033.2:577.17

Modifying Effect of Recombinant Tumor Necrosis Factor on Metastatic Potential of Tumor Cells

907C0604A Kiev EKSPERIMENTALNAYA ONKOLOGIYA in Russian Vol 12 No 1, Jan-Feb 90 pp 43-47

[Article by Yu. I. Kudryavets, Oncology Problems Institute imeni R. Ye. Kavetskiy, UkSSR Academy of Sciences]

[Abstract] In a study of the direct effect of recombinant tumor necrosis factor (rTNF) on the metastatic potential of tumor cells, experiments were conducted on 249 female C57BL/6 mice aged 6 - 8 weeks. The LL cell line and its high and low metastasis clones E6 and D2 (Lewis 3LL lung carcinoma), MM-4 (melanoma B-16) and MAK-3 clone C7 (Ehrlich's carcinoma) treated with rTNF were used. V. G. Korobko (Bioorganic Chemistry Institute imeni M. M. Shemyakin, USSR Academy of Sciences) provided the highly purified preparations of human rTNF-α and rTNF-αδ4 with a specific activity of 1.6×10^8 and 5×10^7 units of protein, respectively. Pre-treatment of the tumor cells with rTNF in a nontoxic dose modifies their metastatic potential, and brief treatment for six hours greatly amplifies it. A very small dose of rTNF stimulated spontaneous metastasis of the LL-D2 cells. It was therefore shown that rTNF modifies the phenotype of the tumor cells and their oncogenicity, increasing the cells' ability to form tumors and metastases. That is especially important as it reveals one of the possible negative consequences of the irrational use of rTNF in oncology clinics. The ability of rTNF to simulate the metastatic potential of the LL cells and their oncogenicity is very important; with brief rTNF treatment these properties of the cells were stimulated, while with prolonged rTNF treatment they were suppressed. Enhancement of the invasiveness of the cells and/or decrease of recognition by the effector cells of the natural resistance of the body is the basis of this phenomenon. LL cells were incubated with rTNF for six hours in a protease inhibitor in a growth culture of sera that was the source of plasminogen necessary for initiating the cascade reaction and activating collagenase in the tumor cells. Such treatment of the cells does not alter the stimulating effect of rTNF on metastasis. The simulating effect of rTNF on the metastatic potential of tumor cells must be considered when creating effective systems for the clinical use of this cytokine. Figures 3, References 15: 1 Russian, 14 Western.

UDC 616-006;615.277.3:577.344.3:541.141.7

Effect of Light-Activated Hematoporphyrin Derivative on Nucleotides and Experimental Tumors

907C0604B Kiev EKSPERIMENTALNAYA ONKOLOGIYA in Russian Vol 12 No 1, Jan-Feb 90 pp 75-77

[Article by L. M. Bloznyalite, L. G. Ginyunas, E. V. Yakubchenite, Ya. K. Didzhyapetrene, V. I. Smilgyavichyus, V. A. Kirvyalene, L. A. Gritsyute, A. P. S. Piskarskas, B. A. Yuodka, A. F. Mironov, A. N. Nishnik, A. Yu. Nokel, LiSSR Ministry of Health Scientific Research Institute of Oncology, Vilnius State University imeni V. Kapsukas, Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov]

[Abstract] The effect of a hematoporphyrin derivative and laser radiation on nucleotides and tumor growth was studied. The hematoporphyrin derivative was made by treating hematoporphyrin diacetate with NaOH and neutralizing it with HCl. The photodegradation of biomolecules was studied using the structural components of nucleic acids. Various types of tumors were subcutaneously embedded in mice, and then photodynamic therapy was performed when the tumors reached a certain size. Hematoporphyrin derivative 1 was injected into the abdominal cavity, 48 - 60 hours after which the tumors were irradiated with the laser. Treatment effectiveness was calculated on the basis of tumor growth and average life span of the animals. GMP was the mononucleotide most sensitive to photodegradation. Inhibition of the growth of melanoma B-16 tumors subjected to photodynamic therapy lasted 11 days, and then growth resumed. Photodynamic therapy on animals with adenocarcinoma Ca 755 inhibited tumor growth for 15 days following irradiation, but to a lesser degree than in melanoma B-16. The research shows that photodynamic therapy techniques need to be developed and introduced in domestic oncology practice. Figures 3, References 10: 6 Russian, 4 Western.

UDC 616.379-008.64-07:65.011.56

Automated Work Station For Diabetes Specialist (Problems of Monitoring Diabetes Mellitus Patients)

907C0603A Moscow PROBLEMY ENDOKRINOLOGII in Russian Vol 36 No 1, Jan-Feb 90 pp 55-57

[Article by A. G. Mazovetskiy, V. I. Toloknov, Yu. N. Ryazanov, N. I. Zinchenko, Epidemiology Department of the Experimental Endocrinology and Hormone Chemistry Institute of the USSR Academy of Medical Sciences; Laboratory of Medical-Engineering Cybernetics of the All-Union Scientific Research Experimental Institute of Medical Technology of the USSR Ministry of Health]

[Abstract] New ways of organizing the treatment of diabetes mellitus need to be found. One of the approaches is the use of medical-engineering cybernetics and artificial intelligence. The medical equipment and computer in the physician's office and the medical techniques that automate its functions form the doctor's "automated work station." Automated presentation of test results is also important. Automation of decision making and diagnosis is also based on the development of expert systems when uncertain factors cannot be calculated or a certain quality of treatment (control) cannot be reached. The automated work station was developed based on the principles of a systemic approach to treating diabetes. One of the purposes of the automated work station is to monitor the pathologic process of a disturbance in carbohydrate metabolism, compelling a person to strive to achieve a set standard in interaction with the external environment. The various automated work stations for the polyclinic, hospital, and research institutions are discussed. References 12: 9 Russian, 3 Western.

UDC 582.281:144:631.523

Production and Regeneration of Protoplasts of Phytophthora Infestans (Mont.) D By.

907C0327A Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 23 No 4, Jul-Aug 89 pp 318-321

[Article by A. V. Dolgova and Ye. V. Gorbunova, Moscow State University imeni M. V. Lomonosov, Department of Mycology and Algology]

[Abstract] Successful production of protoplasts requires cultures of the proper age (from several hours up to 7 days), selection of the enzymic complex to lyse the cell walls and the osmotic stabilizer of protoplasts. Strain PT_1, isolated from damaged tomato plant, and strain K, isolated from potato, were used to produce protoplasts of *Ph. infestans.* Use of a combination of mannite (0.55 M) combined with $CaCl_2$ produced the highest yield of protoplasts. Protoplast yield was about the same for the two strains and depended on the osmotic stabilizer used. Maximum yield of protoplasts of *Ph. infestans* occurred under the following conditions: age of fungus culture, 4 days; pH 6; osmotic stabilizer, mannite + $CaCl_2$ (0.55 M + 0.1 M, respectively); lysing complex of enzymes, mixture (1:1) of 1.5 percent snail gastric juice and a culture fluid of *T. viride.* Protoplasts occurred in three sizes (small, medium and large), with medium predominating. The number of nuclei in the protoplasts varied from 0 to 22, while only one out of 100 stained protoplasts had no nucleus. Single nucleus protoplasts made up 19 percent of the total number, but they did not occur in the group of large protoplasts. References 19: 3 Russian; 16 Western.

UDC 675.895.775+576.851.45

Elevating the Obstruction-Forming Capacity of Plague Microbe in the Flea Organism

907C0328A Leningrad PARAZITOLOGIYA in Russian Vol 23 No 5, Sep-Oct 89 pp 427-429

[Article by G. A. Voronova, Anti-plague Institute of Siberia and the Far East, Irkutsk]

[Abstract] The researcher studied the frequency of obstruction in the proventriculus in fleas infected by the plague microbe. The study—which involved the use of the virulent strain of plague microbe I-2379, isolated in 1978 in Tuva, and the flea *Xenopsylla cheopis* Roths., 1903—included experimental groups of 385 and 300 fleas infected on white mice infected naturally and a control group (585 fleas) on animals infected artificially. Obstruction of the proventriculus occurred 2 - 3 times more often (59.5 percent and 34.0 percent) in fleas infected on white mice infected naturally than in the control group. The insect's bactericidal factor affected the plague pathogen when it was in the gastrointestinal tract and increased the obstruction-forming capacity of the plague microbe. References 4 (Russian).

UDC 582.282.123.2:620.193.8

Probability Nature of Conidia Aspergillus Niger Adhesion to Polymer Surfaces

907C0385B Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 5, Sep-Oct 89 pp 39-44

[Article by I. V. Kaznacheyev, K. Z. Gumargaliyeva, Yu. V. Moiseyev and S. N. Mironova; Institute of Chemical Physics, USSR Academy of Sciences, Moscow, Institute of Microbiology, BSSR Academy of Sciences, Minsk]

[Abstract] A study of the probability nature of adhesion of the microscopic fungus *Aspergillus Niger* var. Tiegh to polymer surfaces involved growing *A. niger* on a Chapek medium at 30°C for 14 days; the suspension produced was then washed in distilled water, collected on membrane filters and dried at room temperature. Polymer materials of different degrees of hydrophilicity (polyethylene and cellophane) served as a base to which a conidia suspension (titer 10^6/ml) was applied. Samples were centrifuged, and the number of adherences was counted. Adhesion of *A. niger* had a probabilistic nature because of the size heterogeneity of the conidia and the heterogeneity of the polymer bases. The distribution of conidia according to forces of adhesion followed a Gaussian pattern. The quantitative nature of the process of interaction of the microscopic fungi and the solid polymer surfaces may serve as a criterion of microdestruction of materials. Figures 7: References 7 (Russian).

UDC 579.881.11

Biological Properties of Bernet Rickettsia Isolated in the Northwest of the UkSSR

907C0385C Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 5, Sep-Oct 89 pp 60-67

[Article by N. D. Klimchuk and Z. G. Kushnir, Scientific Research Institute of Epidemiology and Microbiology, Lvov]

[Abstract] A 1987 study of Q fever in the Northwest of the UkSSR (Volyn Oblast and Rovno Oblast) in natural foci of this disease revealed two strains of Bernet rickettsia. Strain "Politskiy" was isolated from the common vole near the village of Politsy in Vladimiretskiy Rayon, Rovno Oblast, and strain "Gishin" was found in ixodid ticks in the village of Gishin in Kovelskiy Rayon, Volyn Oblast. Study of the biological properties of those strains of the Q fever pathogen, found for the first time in that region, showed that strain "Gishin" was highly virulent for guinea pigs and white mice, while strain "Politskiy" was much less virulent for those animals. Corpuscular antigen of phase I, prepared from rickettsia strain

"Politskiy" was highly active in identifying the corresponding antibodies in blood sera of laboratory animals, which made it possible, later, to use it to diagnose Q fever in humans. The highly-sensitive indirect immunofluorescence reaction indicated the possibility of determining antibodies to phase I of the pathogen by the 17th day after infection. The presence of the Q fever pathogen with varying degrees of virulence confirmed the necessity of sound diagnosis and isolation of Q fever patients among persons with febrile diseases. Figures 2, References 18: 16 Russian, 2 Western.

UDC 579.264

Effect of Aerococcus Viridans, Basis of New Therapeutic-Prophylactic Drug 'M-Bacterin,' on Biological Properties of *Staphylococcus Aureus*

907C0385D Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 51 No 5, Sep-Oct 89 pp 77-81

[Article by M. L. Gorbunova, Ye. I. Lobanova, T. Ye. Drozd, S. A. Turlyun, and V. P. Maganchuk, Dnepropetrovsk Medical Institute]

[Abstract] A group in the department of microbiology at the Dnepropetrovsk Medical Institute has developed a new therapeutic-prophylactic drug, called M-bacterin, from a live lyophilized culture of *Aerococcus viridans* No 17 antagonist bacteria. Studies on experimental models have shown the antagonistic effect of aerococci on pathogenic staphylococci. The Committee of Vaccines and Sera at the USSR Ministry of Health demonstrated the safety and effectiveness of M-bacterin in treatment of acute purulent diseases of the skin and mucous membrane of the mouth which are predominantly of staphylococcal etiology. The aerococci had an antagonistic effect on staphylococci in a wound, demonstrated by the significant reduction of the number of pathogens in the secretion from the wound. This study of the mechanism of antagonistic action of aerococci in relation to *Staphylococcus aureus* showed that combined cultivation of staphylococcus and aerococci in meat peptone broth produced a progressive decrease in the number of viable staphylococcus cells with each passage, with survival of only individual cells after the 7th passage and death of all cells after the 8th passage. Stapphylococcus clones subjected to the effect of *Aerococcus viridans* No 167 in vitro and in vivo formed small colonies with slight pigmentation in comparison with the control. Electronograms indicated deep changes in the cell ultrastructure. Changes in the ultrastructure increased as a function of the duration of contact of the staphylococci with the antagonists in vivo and in vitro. The study revealed the anti-staphylococcal action of *Aerococcus viridans* No 167, upon which is based the new drug M-bacterin. Figures 3; References 11: 9 Russian; 2 Western.

UDC 616.36-018.74-02:615.919]-06-07

Early Ultrastructural Changes in Blood-Tissue Barrier in the Liver Soon After Endotoxin Administration

907C0416G Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 9, Sep 89 pp 365-369

[Article by Yu. A. Barshteyn, Yu. V. Persidskiy and M. I. Grutman, Laboratories of Pathomorphology and of Immunology, Kiev Scientific Research Institute of Epidemiology and Infectious Diseases imeni L. V. Gromashevskiy]

[Abstract] Scanning and transmission electron microscopies were used to analyze the effects of *S. typhimurium* endotoxin on the blood-tissue barrier in the liver in mice. The changes were monitored over a 15 - 60 min period after CBA mice (18 - 20 g) were injected intraperitoneally with a $2LD_{50}$ dose of *S. typhimurium* ultrasonic lysate. The analysis revealed that early changes, within 15 - 30 min, affected the sinusoidal endothelium, consisting of cytoskeletal changes and increased fluidity of the membrane. The ultrastructural changes were interpreted to indicate activation of the endothelial cells as a result of the direct action of the endotoxin. The latter presupposes the presence of endotoxin receptors on the sinusoidal endothelium. The increase in the pores and fenestrae was a change compatible with endotoxin-induced breakdown of the blood-liver barrier. Damage of the venular endothelium did not become evident until the 60th min, underscoring the specificity of the endotoxin for the sinusoidal endothelium. Figures 2; References 12: 2 Russian, 10 Western.

UDC 615.371

Studying Properties of Brucella Strain No 19 in Controlled Submerged Cultivation and Preparation of Dry Vaccine

907C0427C Moscow DOKLADY VSESOYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V.I. LENINA in Russian No 10, Oct 89 pp 40-42

[Article by M. Ya. Yartsev, V. P. Shishov, V. V. Zheltov, N. D. Skichko, K. V. Shumilov, N. A. Mikhaylov, V. Z. Bondarenko, A. I. Klimanov, L. P. Melnichenko, V. K. Grinko, R. G. Yarayev, All-Union Scientific Research and Technological Institute of the Biological Industry, State Shchelkovo Biocombine, All-Union State Scientific Control Institute of Veterinary Drugs, Uzbek Scientific Research Veterinary Institute]

[Abstract] The inadequacy of the present method of manufacturing vaccine from *Brucella abortus* No 19 by growing brucella on solid nutrient media led the

researchers to consider submerged cultivation. Submerged cultivation makes it possible to monitor and regulate the production parameters of cultivation. The biological properties of the bacteria were studied in controlled submerged cultivation in an industrial fermenter and in the production of dry vaccine. Brucella was cultivated in the 0.5 m^3 Elektrolyuks (Sweden) fermenter in a nutrient medium based on meat hydrolysate, with production parameters such as temperature, pH, and pO_2 monitored and regulated. In examining the dynamics of submerged cultivation, the researchers looked at morphology, culture properties, dissociation, and hydrogen sulfide formation, and they determined the optical density and concentration of live brucella in the submerged-growth culture and in the vaccine after sublimation in ampules. Batch cultivation was found to be highly productive and reproducible. The biological properties of the culture used for vaccine production were typical of *Brucella abortus* No 19. References 5: 4 Russian, 1 Western.

UDC 577.323.435

Pattern Recognition in Computer Analysis of Nucleotide Sequences

907C0337A Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 23 No 5, Sep-Oct 89 pp 1248-1262

[Article by N. N. Aleksandrov and A. A. Mironov, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms]

[Abstract] Results of the use of a modified algorithm of the "generalized portrait" pattern recognition theory (developed by V. N. Vapnik et al.) in the search for *E. coli* promoters were presented and discussed. Such studies are especially important in connection with work on determination of the primary structure of the human genome. Closely associated problems involving selection of significant signs, multiple alignment and calculation of coordinates of the recognition vector were discussed. The most significant problems for recognition of signs were presented, as was a hypothesis concerning their independence. Known effectiveness of promoters was used to calculate the recognition vector. The vector obtained was used to analyze the distribution of promoters for certain sequences. The promoters search program for IBM-compatible computers was described. Advantages of use of this method include the possibility of determining the indivisibility of sets, selection of an optimal orientation of the dividing hyperplane and separation of the most significant signs. Figures 5; References 14: 3 Russian, 11 Western.

UDC 577.352.46/113.6

Synthesis, Properties and Interaction With Eukaryotic Cells of Akylating Derivatives of Oligodesoxyribonucleotides Containing Cholesterol or Phenazinium Residue Covalently Attached to the 3'-Terminus

907C0337B Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 23 No 5, Sep-Oct 89 pp 1382-1390

[Article by A. S. Butorin, V. V. Vlasov, L. V. Guskova, V. F. Zarytova, Ye. M. Ivanova, N. D. Kobets, A. S. Rayt, L. V. Yurchenko, Novosibirsk Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] The researchers synthesized radioactive alkylating [4-(N-2-chlorethyl)-N-methylaminobenzyl]-5'-phosphamide derivatives of decadesoxyribothimidylate containing either—free hydroxyl group (I), a hydrophobic cholesterol residue (II), or a polyaromatic N-2-(hydroxyethyl)phenazinium residue (III) at the 3'-terminus. The products were purified by high-performance liquid chromatography and used to study the oligonucleotide-directed alkylation of DNA in isolated cell nuclei and in cells of mouse L-929 fibroblasts and Krebs-2 ascite carcinoma cells. The amount of hydrophobic cholesterol residue bound with the cells was of two orders of magnitude greater than that of the free hydroxyl group and the phenazinium residue. Intracellular alkylation of DNA by the hydrophobic cholesterol residue increased the level of alkylation of DNA by derivatives of the free radical group by more than an order of magnitude both in isolated nuclei and inside living cells. The presence of phenazinium at the 3'-terminus greatly increased alkylation of DNA compared to that of the free hydroxyl group, in spite of the relatively low penetrability of this derivative into the cells. Figures 5; References 24: 15 Russian, 9 Western.

UDC 577.214.625

Cloning Tobacco DNA Fragment With Promoter Properties in Transgenic Plants

907C0337C Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 23 No 5, Sep-Oct 89 pp 1391-1399

[Article by N. N. Domanskiy, L. V. Gening, P. G. Kovalenko, T. V. Medvedeva, A. P. Galkin, and K. G. Gazaryan, Institute of Bioorganic Chemistry, UkSSR Academy of Sciences, Kiev; Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstract] The researchers demonstrate the possibility of using the functioning of regulatory sequences in bacterial cells to select sequences capable of controlling transcription in plants. The research involved a tobacco DNA fragment cloned in this manner and inserted in front of the neomycin 3'-phosphotranferase II (NPT-II) gene in place of the removed bacterial promoter; it was identified by the expression of NPT-II in *E. coli* cells. Recombinant plasmid containing this fragment was introduced into tobacco protoplasts by direct gene transfer. Transformants were selected on the basis of the capacity of tobacco cells to grow on nutrient media containing kanamycin. NTP-II expression in regenerated transgenic plants was highest in the root, lower in the stem and almost absent in the leaf tissue. The nucleotide sequence of the plant DNA fragment with length of 469 base pairs contained conservative segments typical of eukaryotic promoters. Inside the fragment were points of transcription initiation: in the tobacco cells at a distance of 176 and 179 bp and in the *E. coli* cells at a distance of 75 bp from the initiating codon. In *E. coli* cells, the fragment initiates transcription in both directions. Figures 3; References 34: 4 Russian, 30 Western.

UDC 616.74-009.54-085.846

Using Decimetric Waves in Comprehensive Treatment of Myasthenia

907C0390A Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KULTURY in Russian No 5, Sep-Oct 89 pp 65-66

[V. S. Lobzin, A. G. Shiman, L. A. Polyakova, T. A. Fedotova, D. I. Rudenko, Leningrad Institute for Postgraduate Medicine imeni S. M. Kirov]

[Abstract] In spite of the advances that have been made in the study of the pathogenesis, diagnosis, and treatment of myasthenia, differentiated pathogenic therapy designed to restore or improve functions that have been damaged remains a pressing problem. Because the traditional methods of treatment are not effective for many patients, better means of treatment need to be found. In 36 patients receiving anticholinesterase therapy for various forms of myasthenia, the adrenal glands and the sinocarotid area were alternately exposed to an electromagnetic field in the decimeter range. The effectiveness of this comprehensive treatment was assessed electromyographically. Compensation of neuromuscular transmission disorders using anticholinesterase therapy was the basic therapy for myasthenia. A thymectomy was performed on all of the patients. The decimetric wave therapy developed consisted of irradiation of the sinocarotid area one day, and irradiation of both sides of the adrenal gland on the next, at a power output of 6 - 8 watts for 5 - 10 minutes, with a total of 15 - 20 procedures performed on a daily basis. Based on the results, decimetric wave therapy is recommended for the comprehensive treatment of myasthenia. References 6 (Russian).

UDC 616.12-008.318-085.847.3

Magnetotherapy in Arrhythmias

907C0401G Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 89 pp 119

[Article by A. V. Klemenov, No 3 Chair of Internal Diseases, Gorkiy Medical Institute]

[Abstract] Therapeutic trials were conducted with magnetotherapy for 22 patients (11 male and 11 female) with various forms of arrhythmia. Chemotherapy was discontinued during the magnetic procedures. The group, ranging in age from 23 to 64, failed to respond to treatment with a variable magnetic field (AMT-01 apparatus, 50 Hz, 10 - 35 mT) applied in the conventional manner. In fact, in some cases the procedures were poorly tolerated and, in one case, induced an attack of paroxysmal tachycardia.

UDC 577.391.611.8.538.56

Cumulative Biological Effects of Microwaves on Behavior, Efficiency, Weight Gain and Cerebral Neurons

907C0420C Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 660-666

[Article by N. B. Suvorov, M. V. Medvedeva, N. N. Vasilevskiy, V. V. Uryash and Zh. G. Aleksandrova, Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad]

[Abstract] An evaluation was conducted on the cumulative effects of exposure to 2375 mHz microwaves at a power flux density of 500 $\mu W/cm^2$ in albino rats, particularly in terms of the CNS. Exposure of the rats to the microwaves for 4 h/day for a total of 160 h resulted in a statistically significant reduction in weight gain, diminished efficiency, and attenuated vertical mobility. Histologic studies on the brain revealed chromatolysis, pycnosis, and ischemic changes. Pycnosis was evident in 25 percent of the neurons of the frontal cortex and 20 percent of the occipital neurons. In addition, pycnosis was also evident in a number of other brain formations, such as the vestibular nucleus (33 percent), red nucleus (20 percent), central gray matter (21 percent), cerebellar nuclei (17 percent), and Purkinje cells (20 percent). Ischemic changes were particularly noticeable in the reticular nucleus of the thalamus (75 percent) and the intercollicular nucleus of the corpora quadrigemina (70 percent). Finally, chromatolysis was most strongly expressed in the lateral hypothalamus, affecting some 37 percent of the neurons. Figures 4; References 15: 12 Russian, 3 Western.

UDC 577.391.433.538.56

Effects of Millimeter Band Waves on Function and Morphology of Hypothalamic-Hypophyseal Neurosecretory System and Energy Processes in Gastric Tissue

907C0420E Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 672-675

[Article by L. A. Kozhevnikova, L. V. Mukhina, A. F. Kosenko, A. A. Korolkov and L. N. Shelest, Institute of Physiology, Kiev State University imeni T. H. Shevchenko]

[Abstract] The increasing therapeutic use of millimeter waves provided the impetus for a study of their effects on the hypothalamic-pituitary axis and glandular elements of the gastric mucosa in Sprague-Dowley rats. The male rats were irradiated for 15 or 30 min (60 GHz, 3 mW/cm^2); in one set of experiments 30 min and 24 h after physical stress (3 h electrical stimulation of immobilized rats). Morphometric and histochemical studies demonstrated that one or two irradiations of acupuncture point YeSh36 in both the control and stressed rats

led to functional inhibition of the hypothalamic-pituitary axis, thyroid gland, and gastric glandular cells. These changes were more pronounced in the stressed animals and suggest that the therapeutic benefits of millimeter wave therapy in peptic ulcers may be predicated on diminished release of "aggressive" factors by the gastric cells. References 7 (Russian).

UDC 577.391.599.323.4

Features of the Responses of Animals of Various Typology Groups to Exposure to HF and UHF Electromagnetic Radiation

907C0420F Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 676-679

[Article by V. N. Nikitina, N. B. Suvorov, N. A. Minkina and Ye. S. Shaposhnikov, Scientific Research Institute of Labor Hygiene and Occupational Diseases, RSFSR Ministry of Health, Leningrad; Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad]

[Abstract] Outbred male rats were tested for their responsiveness to high-frequency (13 MHz, 500 V/m, 2 h/day, 2 months) and ultrahigh-frequency (12.5 cm λ, 500 μW/cm^2, 4 - 6 h/day, 160 h total) electromagnetic irradiation in relation to background motor activity, on the basis of which they were classified as high- or low-entropy animals. Analysis of the effects on conditioned food reflex, thyroid gland histology, and progeny revealed that typology was an important factor in responsiveness. Recall of conditioned food reflex was improved in the low-entropy animals and delayed in the high-entropy animals, although acquisition was improved in both sets of animals. Thyroid activation was evident in both classes of animals, but involved different mechanisms. In the high-entropy animals, the height of the epithelial cells was increased, whereas in the low-entropy rats, nuclear area was increased. Finally, examination of progeny on antenatal day 20 demonstrated enhanced osteogenesis in the case of the high-entropy parents. References 8 (Russian).

UDC 612.111.014.426].08

Acid Resistance of Erythrocytes in Varying Rate of Induction of Constant Magnetic Field

907C0423J Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 90-92

[Article by G. V. Cherkasov]

[Abstract] Outbred male rats were selected for studies on the effects of the rate of induction (2 - 8 mT/sec) of a 0.4 T constant magnetic field on acid stability of erythrocytes. Both in vivo and in vitro studies demonstated that merely switching on or off affected the erythrocyte membrane, leading to increased susceptibility to acid hemolysis. The increase in susceptibility was directly correlated with the rate of induction. However, in in vivo studies the increase in susceptibility was 2.2-fold lower than in the in vitro studies at 8 mT/sec. Furthermore, manifestation of this phenomenon in the animal studies required animals with a high percentage of juvenile erythrocytes, and in both situations the effects were limited to 30 min. References 15 (Russian).

UDC 615.281.015.2.03:616.9

New Drug, Sulfaton, in Combined Therapy for Infections With Derivatives of Sulfanilamide and Diaminopyrimidine

907C0303A Moscow ANTIBIOTIKI I KHIMIOTERAPIYA in Russian Vol 34 No 9, Sep 89 pp 657-662

[Article by Ye. N. Padeyskaya, All-Union Scientific Research Chemical Pharmaceutical Institute imeni S. Ordzhonikidze, Moscow]

[Abstract] The potentiating effect of derivatives of diaminopyrimidine on derivatives of sulfanilamide and other antibacterial drugs was studied by comparing the chemotherapeutic activity, under different conditions of experiment, of 18 derivatives of sulfanilimide being used in the Soviet Union and abroad. Sulfaton—a new drug based on the sulfanilamide derivative sulfamonomethoxine and trimethoprim, a diaminopyrimidine derivative—was studied in vivo on 5 models of bacterial infections in experiments on 4,500 white mice. A tablet form of sulfaton was developed, and a detailed study of the toxicity of the combination of sulfamonomethoxine and trimethoprim in substances and in medicines cleared the drug for use in medicine; it is being produced in the Soviet Union. It was recommended for use in treating bacterial diseases of average severity (tablets containing 0.25 g of sulfamonomethoxine and 0.1 g of trimethoprim) by 2 tablets twice a day on the first day and 1 tablet twice a day on the following days for 10 - 14 days. Dosage is increased in cases of severe generalized infections. Sulfaton was superior to co-trimethoxasol because of the lower doses required. The course dose of the sulfanilimide component is 3 times lower during use of sulfaton, and the trimethoprim component is 1.5 times lower than in the case of co-trimethoxasol. Sulfaton is well tolerated because of the much lower course dose of the drug. Sulfaton can also be used to treat protozoic infections. It must be used very cautiously in treating mild infections, especially infections in children. References 12: 8 Russian; 4 Western.

UDC 615.31:547.823].015.4:[612.843.015.3:577 .123.3].076.9

Effects of Emoxypin on Baseline Activity of Cyclic Nucleotide Phosphodiesterase (CND) and Late Receptor Potential (LRP) of Isolated Retina

907C0416A Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 9, Sep 89 pp 289-291

[Article by A. A. Shvedova, N. B. Polyanskiy, G. Kh. Akopyan and A. I. Dzhafarov, Institute of chemical Physics, USSR Academy of Sciences, Moscow; Institute of Physiology imeni A. I. Karayev, Azerbaijan SSR, Baku]

[Abstract] In order to elucidate the mechanism of action of the therapeutic benefits of emoxypin (2-ethyl-6-methyl-3-hydroxypyridine) in hereditary retinal degeneration and central chorioretinal dystrophies, the effects of emoxypin on cyclic nucleotide phosphodiesterase (CNP) and late receptor potential (LRP) were studied on isolated retinas of the frog *Rana ridibunda.* Measurements of CNP activity demonstrated that emoxypin behaved like a classical enzyme inhibitor, leading to 52 percent loss of activity. Concomitantly, emoxypin led to a statistically significant elevation in the amplitude of the LRP, but prolonged the lag time. These findings indicate that the therapeutic effects of emoxypin are based on its pharmacodynamic action on cyclic nucleotides, which are involved in the transformation of light energy into electric energy in the retina. Figures 3; References 10: 8 Russian, 2 Western.

UDC 615.213.015.4:612.821.7].076.7

Effects of Valproic Acid on Sleep Patterns and Ethanol Intake Before and After Stress in Rats With Various Behavioral Traits

907C0416B Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 9, Sep 89 pp 294-296

[Article by A. L. Mdzinarishvili, G. A. Molodavkin and T. A. Voronina, Psychopharmacology Laboratory, Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

[Abstract] Male outbred rats (200 - 250 g) characterized by normally high (H) and low (L) levels of motor activity were treated with valproic acid to ascertain the involvement of GABAergic mechanisms in sleep mechanisms and alcohol addiction. Administration of 200 or 400 mg/kg of valproic acid per dose was shown to exert soporific effects in both the H and L animals in a dose-dependent fashion. Analysis of the sleep patterns showed that valproic acid prolonged slow sleep and the latent period to the first REM episode, and increased the number of REM events and their duration. REM deprivation experiments revealed that valproic acid diminished alcohol intake over water in the L animals to a somewhat greater degree than in H animals. These observations were interpreted to indicate that the inhibitory activity of the GABAergic mechanisms are more strongly expressed in H animals than in the L animals. Accordingly, exogenous valproic acid does not potentiate the GABAergic mechanisms to any appreciable extent in the H rats or, therefore, attenuate alcohol intake in that group. The data also suggest that valproic acid should be considered in the management of alcoholism. Figures 1; References 10: 5 Russian, 5 Western.

UDC 612.82.014.467:547.466[:615.21].08

Species and Functional Differences in NMDA-Receptors

907C0416C Moscow BYULLETEN EKSPERIMENTALNOY BIOLOGII I MEDITSINY in Russian Vol 108 No 9, Sep 89 pp 299-302

[Article by V. V. Grigoryev and V. A. Nemanova, Institute of Physiologically Active Substances, USSR Academy of Sciences, Chernogolovka, Moscow Oblast]

[Abstract] Outbred mice (22 - 24 g) and rats (180 - 220 g) were employed in trials designed to assess species and functional differences of NMDA (N-methyl-D-aspartate) receptors, in order to further elucidate the mechanisms of action of excitatory amino acids. The results demonstrated that administration of NMA (N-methyl-DL-aspartate) into a lateral ventricle elicited hyperactivity followed by seizures. In mice the NMA-induced seizures were blocked by administration of 2.5 APV and 2.7 APH, diazepam, and ketamine, although agents that would completely preclude hyperactivity were not found. Rat studies demonstrated that 2.7 APH, diazepam, and ketamine in high doses blocked both hyperactivity and seizures. In addition, kinurenic acid was inactive in mice but inhibited hyperactivity and seizures in rats treated with NMA. These findings demonstrated that rats possess a homogenous population of NMDA receptors that differ significantly from the heterogenous population of NMDA receptors in mice. References 15: 2 Russian, 13 Western.

UDC 615.272.014.425.015.4:612.172.1].076.9

Effect of Synthetic Antioxidant Emoxypin on Coronary Vessel Tone

907C0421A Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 52 No 5, Sep-Oct 89 pp 17-19

[Article by Ye. N. Pashin, A. A. Shvedova, Department of Pharmacology, Kursk Medical Institute, Kursk]

[Abstract] In studying the effect of the synthetic antioxidant emoxypin on coronary vessel tone, the authors used two differential manometers in forty experiments on dogs to examine emoxypin's influence on phasic coronary blood flow. The descending branch of the left coronary artery was isolated and connected with the right carotid artery through the manometer system. The effect of emoxypin on the smooth muscle of the vessels was studied on ten isolated segments of canine coronary vessels. The vessels were perfused with Krebs solution at 35°C. Potassium chloride was added to the buffer solution to increase the concentration of potassium ions in the perfusate. In intracoronary administration, emoxypin caused a dose-dependent dilation of the coronary vessels in the dogs. The maximum increase in the mean coronary blood flow (from approximately 18 ml/min to 29 ml/min) and the maximum decrease in the total resistance of coronary vessels (from approximately 5 mm/ml/min to 3 mm/ml/min) were observed at a dose of 1 mg. The latter indicates improved blood supply to the myocardium. Emoxypin produces a so-called coronarolytic effect, does not redistribute blood flow in cardiac muscle, and improves blood supply to the epicardial and endocardial layers of the myocardium. The increase in coronary blood flow is due to the direct effect of the preparation on coronary vessel tone. References 16: 12 Russian, 4 Western.

UDC 615.272.014.425.015.4:612.172.1].076.9

Features of the Induction of Monooxygenase System Enzymes of the Liver in Rabbits After Intravenous Administration of Fluorocarbon Emulsion

907C0421B Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 52 No 5, Sep-Oct 89 pp 60-63

[Article by V. V. Obraztsov, A. A. Sklifas, N. I. Kukushkin, Laboratory of Medical Biophysics, Institute of Biological Physics, USSR Academy of Sciences, Pushchino]

[Abstract] There are two main reasons for interest in the thorough study of the process of the induction of cytochrome P-450 following the injection of fluorocarbons. Research in this field is necessary to analyze the consequences of using gas-transport transfusion agents, and to make possible the use of fluorocarbons as a preparation for modifying the detoxifying function of the liver. The effect of intravenous administration of a fluorocarbon emulsion on the cytochrome P-450 content in the liver microsomes and activity of the monooxygenase system in the liver was comparatively studied on rabbits by using an antipyrine test. A fluorocarbon emulsion consisting of perfluorodecaline, perfluoro-n-methylcyclohexylpiperidine, and proxanol was administered to male rabbits. Changes in the microsomal cytochrome P-450 content are biphasic; there is an increase in the first stage and gradual return to the original level in the second stage. The changes in the biological half-life of antipyrine in the blood reflect the changes in the cytochrome P-450 level in the microsomes of the liver. The monooxygenase is inhibited the first day after the fluorocarbons are administered. Although the emulsion used was homogenous, perfluorodecaline and perfluoro-n-methylcyclohexylpiperidine were eliminated from the blood at different rates. The level of microsomal cytochrome P-450 and the activity of the monooxygenase system do not reflect changes in the content of fluorocarbons in the liver tissue. The antipyrine test can be used for studying the induction of cytochrome P-450 in human livers with the clinical use of gas-transport transfusion agents based on a fluorocarbon emulsion. Figures 2, References 14: 6 Russian, 8 Western.

UDC 616.833.17-009.11-021.3-085.1-036.8-073.97:[615.47:84

Management of Bell's Palsy With Portable Biofeedback Device

907C0394A Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian Vol 89 No 10, Oct 89 pp 57-62

[Article by V. S. Lobzin, A. A. Smetankin, N. D. Tatskina and N. S. Yashin, Chair of Neuropathology, Laboratory of Biotechnical Systems, and Neural Diseases Clinic, Leningrad Institute of Postgraduate Medicine imeni S. M. Kirov]

[Abstract] Therapeutic trials were conducted with the portable biofeedback device Signal-KD in the management of 34 patients, 17 - 60 years old, with Bell's palsy. The entire course of treatment consisted of 10 - 12 daily procedures lasting for 20 - 30 min, intended to improve the functional status of the frontalis and orbicularis oculi and oris muscles. At the end of the training, the activity integral of the muscles improved to 20.63 mV/sec from 8.32, with the maximum EMG amplitude attaining 46 percent of the amplitude of the corresponding muscles on the unaffected side of the face. Assessment of the clinical data demonstrated that biofeedback training was most promising in patients in whom the condition was attributable to vascular pathogenetic mechanisms. Figures 2; References 10: 4 Russian, 6 Western.

UDC 616.12-008.4-092:612.766.1]-085.357:577.175.44]-036.8

Effects of Chronic Stress and Thyroidin on Cardiac Contractility in Rats

907C0423G Moscow KOSMICHESKAYA BIOLOGIYA I AVIAKOSMICHESKAYA MEDITSINA in Russian Vol 3 No 5, Sep-Oct 89 pp 78-82

[Article by V. I. Kuznetsov]

[Abstract] An analysis was conducted on the effects of long-term stress on cardiac contractility in outbred albino male rats, 170 - 210 g in weight at the start of the experiment. The data demonstrated that animals that had been kept in 12 x 17 cm cells for two months tolerated coarctation of the aorta for four days at rest on par with control rats. In constriction tests of the descending aorta, the force and rate of contraction in the experimental rats exceeded by 33 - 35 percent the parameters in control rats during the first 5 sec. Treatment of the experimental animals intragastrically with increasing doses of thyroidin (1.5 to 3 mg/100 g) over 14 days improved these parameters by a factor of 1.8 - 2.4 over control values. However, the 25-second figures for the experimental rats were lower than for the control animals by a factor of 1.4 - 1.8. The data indicated that long-term stress had an adverse effect on myocardial tolerance of overload conditions, and that thyroid hormones exert a beneficial effect on stressed heart. References 33: 25 Russian, 8 Western.

Tasks of the Republic's Health Care Organs and Institutions in the Context of Restructuring the Health Protection Service and Upgrading the Quality of Public Health Care

907C0402A Kishinev ZDRAVOOKHRANENIYE in Russian No 5, Sep-Oct 89 pp 3-8

[Article by Moldavian SSR Minister of Health K. A. Draganyuk]

[Text] In the republic, as in the country as a whole, the principal ways of solving the key problems of safeguarding and strengthening the health of our people and of affirming a healthy way of life have been outlined, and the priority objectives have been determined in the development of the public health care system; in the fundamental upgrading of the quality of the social, medical and economic activities of health care organs and institutions; in the organization of a system for transferring the achievements of medical science and technology to health care practice; in the essential strengthening and reequipping of the sector's material-technical base, and in the improvement of management at all levels.

In 1991-1995, plans call for building and placing hospitals into operation with a capacity of 8,500 beds; polyclinics accommodating 17,450 visits per shift, including children's and women's dispensaries with a capacity of 6,000 visits per shift; children's homes with a capacity of 300 places; children's sanatoriums with 1,000 beds; 11 laboratory buildings for epidemiological stations; 141 rural medical outpatient clinics accommodating 12,870 visits per shift, with pharmacies and housing; 206 paramedic-obstetric stations; and, among other things, 36 pharmacies. There are also plans for renovating hospitals that account for a total of 4,000 beds and polyclinics accommodating a total of 7,000 visits per shift.

Today in Moldavia, there are 39.4 physicians and 115.8 mid-level medical workers per 10,000 inhabitants. The availability of beds has reached 127.0 per 10,000 population, and the number of polyclinic visits per shift, 181.1.

Outpatient polyclinic care in the republic is now being provided in 50 specialties, while hospital care is being provided in 40.

A sector management system has been approved and placed into operation in the republic. Management is effected at two levels—the Ministry of Health represents one level, and city health departments, central rayon hospitals and treatment-and-prevention institutions, organizations and associations represent the other.

The structure of the ministry has been changed so that there are fewer administrations, departments and workers.

Two category I scientific research institutes—of preventive medicine and clinical medicine—and an institute for the protection of the health of the mother and child have been set up in place of four small-capacity scientific research institutes (of tuberculosis, oncology, cardiology, and hygiene and epidemiology).

As an experiment, the Bendery City Health Department has been abolished, and a central city hospital was established, with a single health care management system for the city. A transition is being made to the evaluation of the activities of health care facilities, structural subdivisions, and workers on the basis of end results. The rights of health care institution directors have been expanded.

A program to develop the material-technical base of rural health care is being implemented.

New forms of health care delivery to the urban and rural public have been introduced, as have differentiated standards associated with the need for hospital care and a number of variants of brigade forms of organization of wages for medical personnel providing outpatient and polyclinic care to the public. The first group of physicians working as "family doctors" has been trained in an appropriate program.

At present, a model of health care structure—the territorial medical association—is under study. The essence of the model consists in the creation of an integrated medical establishment possessing a single system for planning, finance, management, supply, and control of the quality and effectiveness of the health care rendered by all medical institutions. The model calls for cutting certain staff positions and introducing the position of association director, which carry with it the right to resolve the basic issues associated with developing and re-equipping health care. The association's chief physician (assisted by one to three deputies) will resolve the issues associated with development and improvement of health care and its quality control, and with the introduction of new medical procedures.

Development of fee-based services will make it possible to increase the volume of health care rendered to the population by drawing on additional extra-budgetary funds. Consultation and stomatological polyclinics are to be set up on a cost-accounting basis in Kishinev; similar cost-accounting departments are to be created in Beltsy, Tiraspol and Bendery; and the volume of fee-based services both in the home and at the polyclinics of central rayon hospitals is to be increased, especially for services such as massage, therapeutic physical culture, physiotheraphy, hydrotherapy, patient care, and in-home procedures.

Considerable attention is being devoted to the development of the base of the health care sector. In three years of the five-year plan, the republic has placed into operation hospitals with a capacity of 2,307 beds, polyclinics accommodating 14,940 visits per shift, 42 rural medical outpatient clinics with a capacity of 3,930 visits per shift, 123 paramedic-obstetric stations, and 29 pharmacies, all built on the basis of standard or custom designs. Capacities that will enable the level required by the five-year

target to be reached are to be in place in 1990. However, it should be noted that only 80.1 percent of the 148 million rubles of capital investments earmarked for construction of health care facilites in the republic have been utilized over the three years of the five-year plan. There has been an interruption in the opening of facilities.

At present, the republic's health care system have more than 3,500 buildings and structures, of which only 22.8 percent are standard design. More than half of the central rayon hospitals lack a cold running water system, and 51 percent of children's departments and 72 percent of maternity departments do not have hot running water.

Many treatment-and-prevention institutions require repair or renovation. However, repairs and restoration work have been interrupted as a result of unsatisfactory material-technical supply.

Perestroyka has also begun in the medical personnel training system. The basis of the restructuring lies in raising the quality of physician training, with emphasis on practical skills.

State promotion examinations have been introduced, and the volume of professional and, primarily, clinical training provided to future doctors has been increased.

A one-year internship has been introduced as of 1989 for graduates of pharmaceutical and sanitary-hygienic faculties for the purpose of providing them professional training that is more advanced.

Despite the fact that the number of doctors is growing in the republic from year to year, a shortage of doctors—especially pediatricians—is felt in a number of central and southern rayons (Kalarashskiy, Kotovskiy, Nisporenskiy, Keynarskiy, Bessarabskiy, Kantemirskiy, Suvorovskiy, Tarakliyskiy, Vulkaneshtskiy). Preferential enrollment has been established for young people from the indicated rayons in the institute's therapeutic and pediatric faculties, and the enrollment plan for the first year of the institute's pediatric faculty has now been increased to 250 persons.

Improvements are being made in the postgraduate medicine system. Permanent certification commissions have been created for all profiles within the framework of the ministry. Unfortunately, the management of health care organs and institutions and labor collectives are making insufficient use of certification as moral and material incentives that would help to raise the level of professional training among specialists and promote further improvement of the quality of medical services rendered to the population.

The restructuring of health care is closely associated with the inculcation of feelings of greater responsibility, citizenship, kindness and mercy among medical personnel.

Successful solution of the problems facing health care depends to a large degree on the work of every physician, pharmacist, paramedic and nurse. Their work requires competence, constant stress, responsibility, and resourcefulness in emergency situations. But we also need to think seriously about the social protection of medical workers. How can we consider normal a situation in which housing is not provided for more than 10,000 medical workers, including 2,704 physicians and 7,498 mid-level medical workers?!

The failure to solve local living and housing problems promptly is hindering stabilization of labor collectives, is promoting an increase in personnel turnover, and is having an effect on morale, on material status, and, ultimately, on the level, quality and standards of health care.

The design of health care facilities today provides for the construction of housing to accommodate 25 percent of the personnel employed by the facility. Up to 10 percent of the sector's capital investments are supposed to be allocated for those purposes. Contracts have been signed for proportionate participation in the construction of sanatoria, including those for family vacations, and there are plans for building a number of preventive clinics for medical workers and a Pioneer camp.

Prevention has been and continues to be the fundamental principle in all stages of Soviet health care. It is absolutely clear that prevention is a system of integrated, planned statewide medical and social measures. We cannot ensure maintenance and reinforcement of health just by medical measures alone.

Chronic noninfectious diseases (of the cardiovascular system, respiratory and digestive organs, the endocrine system, malignant neoplasms, injuries, poisonings, accidents, etc.) are the main factors underlying the level of morbidity involving temporary and chronic loss of work, disability, and mortality. Prevention of such diseases depends more than on just the activities of health care agencies. Today, the level of morbidity is determined by the state of the environment, by the conditions and nature of work and recreation, and by one's working and family relationships—i.e., by the sum total of socioeconomic, cultural and behavioral factors.

The accumulated data indicate that progressive pollution of the environment is having a negative effect on public health.

The availability of potable water to the republic's population is lower than hygienic standards by a factor of two. Forty-eight percent of rural population centers do not have any plumbing at all, and in many cities and towns, water is supplied in limited quantities.

The extremely limited quantity of water resources, partial solutions of the problems of waste water treatment, and the runoff of pesticides and mineral fertilizers from fields and of manure from livestock breeding complexes are systematically leading to biological and chemical contamination of water sources.

Certain parts of the Dnestr and Prut rivers are becoming unusable as centralized water supply sources. Many centralized water supply sources are not surrounded by health protection zones. As a result, growth of both bacterial and chemical contamination of the water can be noted.

The problems of sanitary soil protection are being solved unsatisfactorily.

Pesticide use in agriculture has declined by a factor of two in the republic in recent years; even so, Moldavia is, as before, one of the leading users in the country of chemical plant protection agents. The methods of their use and storage require improvement.

Scientific research conducted by Moldavian scientists has shown that as the territorial use of pesticides increases, overall morbidity and mortality grows (as does child morbidity and mortality), especially in connection with liver and respiratory pathologies and congenital defects. A decrease in the body's immune defense is noted.

Nitrate pollution has increased. Nitrate levels exceeding permissible levels have been found in the water of 50 percent of test samples from shaft wells, 10 percent of samples from artesian wells, and 15 percent of samples from farming products. That is the result of intensive use of nitrogenous mineral fertilizer and only partial solution of the problems associated with the recycling of wastes of livestock breeding complexes and with sewage treatment.

An unfavorable epidemic situation has been evolving in the republic over a number of years, especially in regard to acute intestinal diseases, against the backdrop of a complex ecological situation. The level of morbidity due to salmonellosis grew throughout practically the entire territory, and it exceeds the union average by a factor of three in some rayons (the Floreshtskiy and Teleneshtskiy rayons and the city of Rybnitsa).

This year, mass food poisonings and salmonellosis-related illnesses (75.2 percent of them were among children) were recorded in rayons such as Sorokskiy, Dubossarskiy, Oknitskiy, Ungenskiy, Chimishliyskiy, Rezinskiy, and Glodyanskiy. That was the result of gross violations of sanitary and veterinary regulations at livestock breeding and poultry enterprises, the dumping of untreated wastes into open water reservoirs, and the irresponsibility of personnel at food service facilities who committed gross violations involving food storage times and conditions and food processing procedures.

Prevention of viral hepatitis B and AIDS is a serious problem for the republic. In 1988, and thus far in 1989, the incidence of viral hepatitis B declined; however, it continues to be almost twice as high as the country average.

The Zdorovye [Health] integrated programs have been called upon to play a great role in creating a healthy work environment and habitat for the population. However, in some places, the management of organizations, enterprises and kolkhozes, and even certain medical institutions is not handling the development and implementation of the programs responsibly or with understanding.

A major place in the program of social transformations has been reserved for development of sanatoriums, health resorts and organized recreation.

Viewing protection of the health of the mother and child as a priority area of health care, we have been allocating every year for the last 10 years more than 40 percent of the total funds appropriated for construction of health care facilities to construction of children's/obstetric institutions.

In most of the territories of the republic, measures to reduce the crowding of beds in obstetric and children's departments, both through new construction and allocation of additional space, have been incorporated.

There are plans for creating a regional scientific-practical center for medical genetics. Preparations are being made to organize a perinatal diagnostic center and its affiliates in the republic's cities. Five premature infant care centers with a capacity of 220 beds have been organized.

A number of measures have been implemented to improve nutrition among children as one of the main factors promoting preservation of the health of children. The percentage of children switched early to, or already maintained on, mixed and artificial baby formulas is high (30 percent); in some rayons that figure is as high as 50 percent. There are good prospects for converting operations producing baby food products to an industrial basis through the use of milk from specially earmarked farms that are attached to production plants and at which forage products are not processed with pesticides or other substances.

The family planning problem is important. We need to organize dispensary observation of adolescent girls, provide them with sex education, and prepare them for family life.

There are serious oversights and flaws in labor protection and safety and in employment for women, and there have been numerous violations of the law on the employment of women in jobs that have a negative effect on their health. As a result, the levels of infant mortality, perinatal pathology, premature births, infertility, etc., are high.

One of the unsolved problems of pediatrics is that of disabled children and children who fall ill frequently and for long periods of time. The losses of work time in the national economy in connection with caring for frequently sick children make up a considerable share of the structure of total losses.

Of special concern are the trend toward growth in injuries in the school, the increase in disabilities among children, and the high incidence of mental illness among children.

The dispensary method of providing services and the organization of polyclinic departments in which it would be possible to carry out all forms of preventive examinations of the population occupy an important place in the present strategy of preventive activities.

Possibilities for providing full-fledged recuperative treatment have appeared.

Day hospitals in polyclinics, day wards in hospitals, and permanent home care have received wide approval among patients. Today, day hospitals have been established in 112 outpatient-polyclinic institutions, including day hospitals for women and children.

Introduction of brigade forms of labor organization has had a positive effect on the quality of health care, on the efficient use of manpower potential, and on the development of criteria for the transition to health care services provided by general-practice and family-practice physicians.

In addition to developing and fortifying the primary component of health care, and to expanding, deepening and upgrading the quality of prevention and mass health screening, we need to solve the problems associated with the improvement and equipping of specialized types of health care: cardiosurgical, neurosurgical, traumatological, urological, stomatological, psychiatric, ophthalmological, otorhinolaryngological etc.

The problem of controlling drunkenness, alcoholism and drug abuse remains acute in the republic. Social and work rehabilitation of drug abusers is poor. The problems of improving the "microsocial environment" are not being solved satisfactorily.

Rural health care is an important problem in the republic because of the high percentage constituted by the rural population (over 53 percent), the working conditions, the particular features of agricultural production involving intensive use of chemical plant protection resources, and the cultivation of tobacco. Those and other factors have made it necessary to bring specialized health care closer to the rural public by basing it at central rayon hospitals, the capacity of which has reached an average of 452 beds, and to build paramedic-obstetric stations, pharmacies and rural medical outpatient clinics on the basis of new standard designs. More than 50 day hospitals with a capacity of 410 beds have been opened on the basis of the latter and are now functioning.

Drug administration is significant in the overall complex of therapeutic and preventive measures. Things are especially bad with children's drugs, blood substitutes and plasma-substituting solutions, preparations to treat diabetics, disposable syringes and systems for transfusing blood and blood substitutes, and many reagents.

Each year the republic receives fixed capital worth over 12 million rubles with which to outfit new and currently operating institutions. At the same time, the needs of health care institutions for medical equipment and instruments are only 60 percent satisfied.

Medical science has an important role in accelerating the solution of the problems of health care.

In light of the regional features of the republic, the most urgent and promising research is research on protection of motherhood and childhood, prevention and treatment of arterial hypertension and cardiopathy, prevention and early detection of malignant tumors, the biomedical problems of alcoholism, traumatology and orthopedics, gastroenterology (including infectious and noninfectious hepatology), diagnosis and treatment of pulmonary diseases, etc.

Transition of scientific research institutes to new management methods, expert assessment of developments at the planning and execution stages, and priority financing of research topics which correspond most fully to the social needs of practical health care will promote an increase in the effectiveness of scientific research.

There is a tremendous amount of constructive work to be done in the future. It includes actively introducing new methods of management and cost accounting into health care, improving the scientific grounds of territorial health care development plans that anticipate the rates of construction of health care facilities of priority significance, protecting motherhood and childhood, improving outpatient polyclinic care, developing specialized medical care and rural health care, reinforcing environmental protection, and other measures of sanitary control.

Raising Soviet health care to a qualitatively new level is a matter for all the people, for the entire state, since nothing is of greater value than the health of the indivudual, which is the most important indicator of a society's well-being.

UDC 614.2(574)

Regional Problems in Protection of the Health of Mother and Child

907C0404A Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 10, Oct 89 pp 1-5

[Article by G. G. Urmurzina, Kazakh SSR Ministry of Health]

[Text] The most important decisions adopted by the party and government in recent years in the area of health care defined the high priority of protection of motherhood and childhood, although, until recently,

that priority was in words only, and attempts to achieve success in the context of a narrowly bureaucratic, stereotypic approach were wide of the mark; moreover, they had an unfavorable effect on the dynamics of health indicators and on the level of infant and maternal mortality in the Kazakh SSR.

In demographic terms, Kazakhstan has been a region with a progressive type of population reproduction (children represent 33.3 percent of the population, as compared with an all-union figure of 24.7 percent) and a high birthrate (24.5 births per 1000, as compared to 19.0 for the USSR). In that setting, highly acute regional problems were overshadowed, and imbalances in the distribution of material-technical resources and personnel resources were hidden, because the potential of the service for protecting the health of mother and child was assessed by means of averaged indicators. When we look at numbers, we find that the Kazakh SSR has half as many pediatricians as the standards call for, and fewer obstetrician-gynecologists by a factor of 1.5. That imbalance is greatest in the oblasts with the highest birthrates. For example, Chimkent, Dzhambul and Kzyl-Orda oblasts have fewer pediatricians and fewer obstetrician-gynecologists than the country average by factors of 3 and 2.5, respectively. The workload of an obstetrician-gynecologist in Chimkent Oblast is 2.2 times greater than that of the same specialist in North Kazakhstan Oblast, and 3.3 times greater than that of a specialist in the Baltic republics. Moreover, in the oblasts of southern Kazakhstan, obstetric and children's hospitals are filled to 2 - 2.5 times their capacity, which, in light of the poor water supply, promotes purulent and septic disease among newborn infants and intrahospital infections.

In light of all that, the Kazakh SSR Ministry of Health has developed and is now introducing a regional principle for the distribution of personnel, medications, and medical equipment, an action that made it possible as early as 1988 to direct to five oblasts in the southwestern region 60 percent of the total appropriations earmarked for medicines and equipment for the republic and twice as many specialists as in previous years.

Improvement of the mother and child health protection service requires an integrated, systems approach. For today, maternal mortality is a barometer of the society's socioeconomic development. That is precisely why the growth in the number of pregnant women in the republic who are at high risk in terms of their own health and the health of the child indicates that obstetricians and pediatricians alone cannot solve the problem.

One of the most serious causes of the present state of affairs is a lack of attention devoted to mothers. Their health index is 30 percent—that is, 70 percent of our republic's female population is ill. One out of every three women is anemic.

The number of women employed in adverse working conditions is declining slowly. For example, some 317,600 of the republic's female laborers are still working in hazardous shops and in production operations, and almost 139,000 are working night shifts. There is particularly little concern shown for them at enterprises of the Gosagroprom, Gosstroy and the Kazakh SSR Ministry of Grain Products. The number of women who do heavy physical labor in the metallurgical industry is 36,300, of which around 16,000 work night shifts; in light industry, 9,000 women do heavy physical labor; and at enterprises, sovkhozes and kolkhozes of the Gosagroprom, 10,000.

Every year, health improvement among pregnant and gynecological patients is extremely inadequate, and that, at a time when up to 6 percent of all women need sanatorium and health resort care. Unfortunately, this problem is not being solved locally, despite the fact that the health of newborn infants depends on the health of the future mothers!

Special research conducted in the republic has demonstrated that the health of a woman and her children (this is most typical of persons of the indigenous nationality) worsens, for the most part, because the woman has so many childbirths, and especially because the childbirths are so closely spaced; another reason is the use of a harmful method of pregnancy termination—abortion. That is why family planning and birth control must include consideration for ethnic features and must be conducted consistently, with deliberateness, and with the participation of local public education organs, trade unions, women's councils and other social organizations. Nor has enough been done with health education, which must be conducted in the vernacular in all population groups. The objective is to attain a two- to three-year interval between births.

Problems associated with improving the medical care provided to women and children cannot be solved without substantially improving the material-technical base of children's and obstetric institutions. At the moment, however, the average bed capacity of the republic's children's and obstetric hospitals remains considerably below the unionwide standards. To this day, most obstetric institutions are in extremely crowded accommodations, in quarters that fail to meet sanitary standards; in a number of central rayon hospitals of Chimkent, Guryev, Kzyl-Orda, and Ural oblasts, they are located in emergency buildings. Children's and obstetric facilities are being erected at a slow pace and with poor quality, and as a rule, the capital investments that are allocated are not being utilized. Construction time stretches out over many years. Facilities are turned over for operation with much of the construction not yet finished.

The issue of bringing maternity hospital space up to standard requires immediate resolution. There can be no delay in completing construction of maternity hospitals in Guryev, Kzyl-Orda, Kokchetav, Kustanay, Taldy-Kurgan and Petropavlovsk, and of two oblast children's

hospitals in Kzyl-Orda and Chimkent oblasts. The recommendations of the Republic Scientific-Practical Conference on Protection of the Health of Mother and Child (1989) must be carried out. The conference proposed that ignoring the needs of the material-technical base of children's and obstetric institutions be considered an infringement of the rights of mother and child.

In the Kazakh SSR, the capital-labor ratio of children's and obstetric institutions is low, and there is no capability for prenatal diagnosis of congenital abnormalities in the fetus; and that, at a time when congenital pathology represents 10 percent of the causes of infant mortality. Acquisition of ultrasonic equipment (60 units at a total cost of 2 million nonconvertible rubles) will make it possible to halve the number of newborn infants with congenital developmental defects, which will in turn guarantee a 5 - 7 percent decrease in infant mortality.

Up to 30 percent of newborn infants die in rural hospitals within the first day. Such a crisis situation dictates the need for emergency measures to create conditions for the start up of intensive therapy, beginning with rural medical outpatient clinics and resuscitation departments of central rayon hospitals and ending with large children's and infectious hospitals. Expanding the rights of management in local organs and institutions to earmark additional wage allocations for financing staff positions of medical personnel and for redistributing some of the vacant positions of physicians and mid-level medical workers, would be a realistic foundation on which to create staged care. There is one other way to solve the problem—to create traveling pediatric teams at first aid stations to provide assistance in children's and infectious hospitals, as well as special pediatric teams to provide intensive therapy in the home.

Setting up oral rehydration points at all stages, plus effective, clearly defined work in microdistricts, will also help to reduce infant mortality in rural areas.

Children's nutrition continues to be an acute problem. There are more than 360,000 children one year old or younger in the republic, and up to 30 percent of them are on an artificial diet. Proper nutrition is vitally important to them. A number of government decrees have been adopted in recent years in connection with the extremely unsatisfactory provision of specialized food products to children in the republic in their first years of life. However, efforts to implement these vitally important decisions have been curtailed almost entirely.

Under such conditions, children's dairy kitchens continue to be important in our region, especially in rural areas. However, for all their large numbers, the hopes placed on that service are not being borne out, because of their small capacity, poor equipment levels, frequent closings, poor sanitation, and poor product quality. Therefore, we need to consolidate the children's dairy kitchens by reducing the number of small ones, create a powerful rayon-level children's nutrition service at the central rayon hospital, and solve locally the problems of providing them with high quality milk on a priority basis and supplying them with new equipment and with water supply and sewage systems. The work of the existing large mechanized kitchens in the cities also requires fundamental restructuring. The first thing we need to do is to transfer those subdivisions administratively to the agro-industrial complex.

If we are to solve the problem of setting up proper nutrition for women and children, health care management at all levels, plus a wide range of pediatricians and obstetrician-gynecologists, must demonstrate an active civic position and be resourceful in planning and efficiently implementing measures in response to every local problem. The executive committees of local soviets also need to exert their powerful influence. It is on those very people that the solution, in large part, depends for such urgent problems like assigning pregnant women to order desks. That should be done first of all for women suffering from anemia. A positive example of such an approach to the matter can be found in Mangyshlak and in Guryev and Dzhezkazgan oblasts.

Prevention has recently acquired special urgency in the matter of improving the work done at children's polyclinics. Children's health education offices and rooms have been set up in the departments of all children's polyclinics, and the work of reducing the size of pediatric districts has been completed. Forty recuperative treatment departments are functioning in the republic. Recuperative treatment polyclinics have opened in Tselinograd and Karaganda, and their experience confirms the promise held by the development of this form of medical care for the child population. Other new forms of work such as day hospitals attached to polyclinics and home hospital services are being widely introduced. The experience in setting up day hospitals in Taldy-Kurgan Oblast deserves attention. They have had both a direct and an indirect economic impact; but most important, they have improved the health of twice as many people as before.

The transition to a system of medical services for children based on the "same pediatrician" principle (Alma-Ata, Alatauskiy Rayon; Alma-Ata Oblast, Talgarskiy Rayon; Leninogorsk, East Kazakhstan Oblast; Nikolsk, Dzhezkazgan Oblast) allows one and the same physician to provide medical care both in the preschool facility and at the place of residence of the patients. That embodies the most important principle of Soviet health care—an individual approach to organizing therapeutic and health improvement measures in the family and the collective; it enables planned improvement of the health of risk-group children and outpatients, as well as specific preparation of youngsters for enrolling in school.

In rayons with high child mortality indicators, the method practiced is for services to be provided by specialists from oblast and republic institutions and by staff members from the Scientific Research Institute of Pediatrics, Obstetrics and Gynecology, from specialized

departments of medical institutes, and from the Alma-Ata Institute for the Postgraduated Medicine.

In the last three years, during flare-ups of intestinal infections, teams of qualified specialists from Kazakhstan, the Baltic republics, and the RSFSR have made "forays" into the republic's oblasts that have poor infant mortality indicators. That has made it possible to somewhat improve the medical care provided to women and children in those regions.

The problem of protecting mothers and children is aggravated in a number of oblasts by poor ecological conditions. As a result, additional programs have been implemented in those zones.

In accordance with an approved integrated specific-purpose program, teams of specialists from Alma-Ata are conducting universal mass health screening of the population of the Aral region and are providing practical assistance. A program is also being developed for ecologically damaged regions of Semipalatinsk Oblast.

Morbidity can be reduced considerably by curtailing the use of banned ammonium nitrate, by reducing the use of pesticides and mineral fertilizers, and by replacing them with biological plant protection methods developed by the USSR All-Union Agricultural Academy imeni V. I. Lenin. The republic's industrial enterprises need to be converted to waste-free procedures for recycling accumulated wastes.

The health of preschool children—among whom the number of children who are sick often and for long periods of time is on the rise—remains an alarming regional problem. The solution is to implement measures aimed at managing nutrition in children's preschool facilities and in boarding schools in a radically better fashion, creating the conditions for a healthy lifestyle, eradicating bad habits, implementing health improvement measures, and screening the children's health in a timely manner. But, unlike in former years, those tasks must be handled not by the health care sector alone, but in close association with public education and with the enterprises and administrative departments under the sponsorship of local soviets of people's deputies.

Difficulties in pursuing the preventive measures involved in health improvement among the population stem from poor local perception of the principles of a healthy lifestyle. The responsibility shown by the family for preserving a child's health is on the decline. Carelessness in child-rearing has not been eradicated, and customs and traditions that harm the health of the mother and child have survived. The scarcity of printed medical material, especially among rural residents, makes it extremely difficult to reverse the backwardness in the population's knowledge of sanitation and hygiene. Those difficulties may be surmounted only by consolidating the efforts of medical workers, members of the Znaniye and Red Cross societies, and newspaper, periodical, radio and television journalists. The mass media and local publishing houses could also play a more active role in promoting a healthy lifestyle in Kazakh, Russian and other ethnic languages.

Because the number of complaints from the population concerning poor medical services has not declined, we need to intensify educational work among medical personnel employed in the system for protecting mothers and children. As stated in the appeal of the 12th congress of the country's pediatricians, charitableness and the struggle against bribery, callousness and heartlessness among medical workers are the most fundamental principles of perestroyka that will ensure a qualitatively new level of services in the children's and obstetric treatment-and-prevention institutions of our republic.

Great tasks face the specialized scientific research institutes and the school departments of pediatrics, obstetrics and gynecology. Besides carrying on fundamental research, they need to concentrate their efforts on solving the acute problems of practical health care. That means, above all, developing modern forms of treatment and preventive care for pregnant women and newborn infants and implementing therapeutic and organizational measures aimed at reducing maternal and infant mortality. We need to expand considerably scientific research on infectious pathology and the epidemiology of noninfectious diseases in children, which determine the health of children and which underlie pathology in adults.

The most important prerequisite of the effectiveness of scientific research is that its results be used in practical health care. In that context, the main role should be played by oblast councils for the introduction of health care practices, by republic and oblast societies of pediatricians and obstetrician-gynecologists, and by the chief specialists in the health care sector.

The medical service for the protection of mothers and children can be improved only if the republic interdepartmental scientific-practical program recently approved by the Kazakh SSR Council of Ministers is carried out and only if the integrated Zdorovye [Health] programs and the programs of cooperation between medical institutions of Central Asian republics and Kazakhstan, which take into account the diversity of local peculiarities and features, are implemented. This important work should be a priority not in words, but in deeds.

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Children's Infectious Morbidity

907C0404B Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 10, Oct 89 pp 11-13

[Article by Ye. S. Belozerov, T. S. Dzhasybayeva, G. P. Nadeyev, A. Ya. Kubareva and N. I. Churko, Alma-Ata Medical Institute, Republic Epidemiological Station]

[Text] Chickenpox, rubella, mumps, measles and scarlet fever occupy a leading place in the structure of children's infections. Over the last five years (1983-1988), overall morbidity associated with pediatric infections decreased by 26.4 percent, including a twofold decrease in measles and a 3.7-fold decrease in mumps. At the same time, diphtheria cases rose from 5 in 1983 to 64 in 1988. A very poor situation has evolved in Chimkent, Guryev, Semipalatinsk, Aktyubinsk and Ural oblasts. There is an intensive influx of adults into the epidemic process.

Morbidity indicators are highest among children 7 - 14 years old. That stems from gross violations of sanitation and hygiene and from poor oral hygiene among children with ear, nose and throat pathology when foci of toxic bacterial circulation form in schools. Such a situation is especially typical of Aktyubinsk, Guryev, Karaganda and Ural oblasts and Leninsk. No appreciable improvement is observed in immunoprophylaxis, although, for the most part, those who become sick are unimmunized persons (48.4 percent) or improperly immunized persons (23.4 percent). Timely coverage with diphtheria vaccinations for children 1 year or under involved 32.9 percent in Semipalatinsk Oblast, 33.5 percent in Dzhambul Oblast, 37.8 percent in Pavlodar Oblast, 38.1 percent in Alma-Ata Oblast, 38.4 percent in Ural Oblast, and 39.0 percent in Aktyubinsk Oblast and in Alma-Ata. That figure is extremely low in Leninsk—17.4 percent—which set the stage for the high morbidity there (31 out of the 64 patients who contracted the illness in the republic in 1988).

Revaccinations are still not being carried out on a schedule; while revaccinations are recommended for 75 percent of the republic's population, only 69.2 percent receive their first revaccination. The intensity of immunization efforts is not being studied adequately. In 1987, that work left something to be desired in Taldy-Kurgan, Pavlodar and Semipalatinsk oblasts and in Alma-Ata. The percentage of seronegative reactions among children is high in East Kazakhstan (38.5 percent), Guryev (26.3 percent), Dzhambul (14 percent), Chimkent (14 percent) and Alma-Ata (13.5 percent) oblasts. Laboratory surveillance aimed at identifying carriers is not being provided for in Dzhezkazgan, North Kazakhstan, Taldy-Kurgan, Tselinograd and Kokchetav oblasts. The ratio of patients to carriers is between 1:1 and 1:1.5 in Dzhambul and Chimkent oblasts and in Alma-Ata (the epidemiological index is 1:3). In the Aktyubinsk and Ural oblasts, it is equal to 1:12 and 1:17, which is an indication that patients are shifting into the category of diphtheria bacillus carriers.

Diagnosis of diphtheria is poorly organized as well. In a number of cases it is diagnosed only after development of complications, and in 30 percent of the cases, after positive results in bacteriological tests. Physicians in the Alma-Ata, Semipalatinsk, Ural and Dzhambul oblasts and in Alma-Ata have been responsible for tardy hospitalization resulting from untimely diagnosis (on the 5th - 11th days of illness).

Serious flaws in immunoprophylaxis have resulted in cases of poliomyelitis among children in the republic today, and some of those children are of immunization age (from 5 months to 5 years). Such cases occurred in 1987. Serotype II and III virus, which circulates in the environment, elicited the disease. Out of 200 strains of enteroviruses isolated from the environment, 23 were identified as poliomyelitis viruses. Half of them are of type II, which has an unfavorable prognosis.

Things are especially bad in terms of prevention of poliomyelitis in Leninsk and in the Dzhambul, Kokchetav, North Kazakhstan and Semipalatinsk oblasts. Immunological protection against poliomyelitis is lower than the republic indicator (67.0 percent in 1987) in the Karaganda, Dzhezkazgan and Chimkent oblasts. In 1988, cases of this infection were allowed to occur in the Chimkent, Dzhambul, Guryev, Pavlodar, Taldy-Kurgan and Ural oblasts and in Alma-Ata.

In light of the fact that the republic remains epidemically vulnerable to poliomyelitis, a program of epidemiological surveillance that would include tracking immunity and tracking circulation of the wild polio virus and vaccine strains in the environment needs to be implemented, and as many children as possible need to be immunized, the number of temporary medical excuses must be kept to a minumum, and children in the risk group must be kept healthy.

Despite the decrease in measles-related morbidity in the republic, the results do not, unfortunately, meet expectations, and the effectiveness of measles vaccinations is not high enough. In 1988, the incidence of measles increased by 214 percent in comparison with the previous year. It increased by a factor of 10 in Semipalatinsk Oblast, 8.4 in Tselinograd Oblast, 7 in Taldy-Kurgan Oblast, 3.5 in Ural Oblast, and 3.5 in Alma-Ata. The average republic indicator (49.0 per 100,000 population) was surpassed by Tselinograd (292.7) and Taldy-Kurgan (73.8) oblasts and Alma-Ata (73.8).

The weakness of efforts to study immunity to measles is noteworthy. Among vaccinated children, seronegative reactions are highest among those aged 5 - 6. Groups in which that level reaches 40 percent were revealed in Chimkent Oblast. Violations of vaccine storage conditions raise concern. Vaccine activity was found to be drastically reduced in 15 percent of 227 samples. Immunization with such a vaccine is not very effective.

Because of the republic's continuing tactic of excusing children from immunizations owing to medical indications, more than 17,000 children over 2 years of age were not immunized as of 1 January 1988.

In the zoonoses group, a marked increase in the population's morbidity occurred in the last 10 years. For example, the incidence of brucellosis more than doubled, and the quantity of leptospirosis patients grew as well. At the same time, the absolute number of anthrax patients decreased by a factor of two.

The problem of eliminating brucellosis has been scientifically solved, and the effectiveness of its elimination has been demonstrated both abroad and in our country (in the UkSSR). However, the high infection rate among agricultural animals in our republic is preventing us from initiating planned eradication of the disease, which would require slaughtering an entire herd, burning buildings, etc., if even one sick animal were found in it. As far as medical measures are concerned, world practice shows that brucellosis cannot be overcome by them.

In the transmitted disease group, rickettsiosis occupies the dominant position, though in the last decade the absolute number of cases decreased by more than a factor of two. While in 1978 rickettsiosis accounted for a fourth of the cases of transmitted diseases, it accounted for 14.2 percent in 1988.

A study of the structure and percentages of various nosological forms of zoonotic and transmitted infections has established that 86.2 percent consist of brucellosis diagnosed for the first time, 7.9 percent are Q fever, and 3.2 percent are leptospirosis. Transmitted infection is represented primarily by rickettsiosis (83.2 percent) and malaria (16.8 percent). Thus, these data attest to growth of many infections. Integrated study of the factors promoting morbidity in the population acquires special significance in this connection. We feel that it would be suitable to introduce scientifically substantiated health improvement and prevention measures into medical practice, which should have a large socioeconomic impact. COPYRIGHT: "Zdravookhraneniye Kazakhstana", 1989

Health Ministry Official Discusses Radiation Situation

907C514A Moscow SELSKAYA ZHIZN in Russian 4 Feb 90 p 4

[Interview by V. Shcherban with Lev Aleksandrovich Buldakov, deputy chairman, National Commission on Radiation Protection of Public, USSR Ministry of Health: "Interview About Extreme Fear—From Lack of Knowledge?"]

[Text] In publishing this article we know that it will cause discontent in many. The things our interviewee, the well-known scholar and radiologist L. A. Buldakov, speaks about sound too unconventional. Even he himself, after turning to the final page of the interview, noted with bitterness:

"There will be a mass of indignant letters. Indeed, they are deceiving us again. But the truth must finally be told. Or else fear of radiation will finish us off.

"Not a month, week, few days, or at times even a day passes without the public being worked up by sensational news: radioactive wastes were discovered at some dump, killer homes have been discovered with walls made of "contaminated" cement, radioactive mushrooms are being advertised "outside the law"... Chernobyl gave birth to radiophobia. And, like inflation, these fears have not yet begun to subside."

We met with L. Buldakov, deputy chairman of the National Commission on Public Radiation Protection of the USSR Ministry of Health and academician. Here is what he said.

[Question] Lev Aleksandrovich, how would you assess the current radiation situation in the country?

[Answer] As satisfactory. I will say more. If all of our people consumed products from the Chernobyl area exclusively, they would receive an additional 7 millirems [rem - roentgen equivalent man] each per year. This is only 10 percent of the yearly dose, which is absolutely not hazardous. Ab-so-lute-ly!

[Question] Are you not being too calm? I am afraid that not many share this optimism.

[Answer] It is not radiation that worries me as much as the alarmed mood of the people.

[Question] But it is no accident that the people are worried. And you know why—page through the newspapers! They are absolutely full of articles about radiation finds. You do, I hope, verify these warnings? Which predominates: truth or fiction?

[Answer] There are not enough hands for everything. But we are trying to verify the "flagrant" facts. Recently, for example, I traveled to the village of Polesskoye in Belorussia. The local residents insisted on resettlement. They thought that their dose levels were high. We checked. It turned out that there was no health hazard; the level is between 3 and 5 rems...

[Question] Excuse me, Lev Aleksandrovich, what kind of figures are these that you are always presenting?

[Answer] We are talking about doses entering the body. Our commission determines the maximum acceptable doses. Our commission includes specialists from agriculture and power generation, physicians, workers from various institutions and institutes... In November 1985 we created 19 working groups to develop a special program of new radiation safety standards. But we have been forced to create new groups periodically; indeed, people are now interested in the acceptable levels of radioactive substances entering the body with foodstuffs. And such a group to develop provisionally acceptable levels of the entry of radioactive substances into the body has been created.

[Question] What do these levels that are not harmful to health represent?

[Answer] They are different for different people. We established that doses at the level of 100 rems for 70 years of age do not cause noticeable harm to a person; however, since a child's body is twice as sensitive as an adult's is, we reduced this value even further—to a third.

A value of 35 rems for an entire lifetime resulted. No grave consequences of this dose should be anticipated.

As far as the Chernobyl region is concerned, in developing the concept of a life dose we stipulated the following: if this concentration is accepted, people may live and go about their business in those places where it is possible to "confine oneself" within the standard of the lifetime dose. That is, those who left previously can return to the land, raise cattle, and virtually not alter their way of life.

[Question] And is this dose of 35 rems comparable with analogous indicators abroad?

[Answer] The doses in other countries are generally higher. For example, in our country mandatory emergency resettlement begins if the irradiation dose may exceed 75 rems, but at the discretion of the local authorities it may begin between 25 and 75 rems. Abroad people are resettled at 100 or more rems. As you can see, our approach is stricter.

[Question] But voices have recently begun to sound that the dose for the public should be lowered.

[Answer] Both the Ministry of Health and the national commission welcome such an approach. Indeed, for several years we have spoken the word "radiation" to anyone who was willing, but not to ourselves. Then Chernobyl occurred, and it turned out that we were all afraid of radiation. Will we soon understand that it is possible to live calmly in those regions where the Ministry of Health has permitted? In a word, an enormous educational effort is needed—this is the best medicine for fear. And nothing more. We will need a minimum of two generations for this fear to pass. How can we calm those who, having surrendered to the clearly erroneous handling of matters in the first days of the accident at the nuclear electric power plant, have not allowed their children to go out onto the street for 18 or more hours afterward, or for 2 months or 2 or 3 years and who have created a regimen for them that is essentially a prison regimen? People still do not understand with their hearts and minds that the earth on which they have sown their misfortune can also be used to raise potatoes, onions, and tomatoes, raise domestic livestock. It is very difficult to talk.

[Question] It was recently reported that the Zhitomir Oblast, which neighbors Chernobyl, is selling meat at the markets in Kiev. And the gauges show that the meat in fact "glows." But the authorities rushed to calm customers: "Really, there is nothing frightening here..."

[Answer] All of this is from the same old song: ignorance gives rise to unfounded fears. Throughout the entire world a principle for calculating standards regarding the content of radioactive substances in food products has been adopted, and it states primarily that the total amount of radioactive substances in products, if they are used in food, do not exceed more than 0.1 rem per year. In real life it is impossible to imagine a situation in which the same Kievans constantly received contaminated meat from one and the same place and that all of their other foodstuffs were also "dirty." The law of the "food basket" is in operation here, so the amount of radioactive substances contained in bread, cottage cheese, milk, meat, and other products that a person consumes in a year does not exceed the dose. Therefore, let us say, in England, France, and Switzerland the radioactive contamination of several products, provided less than 10 kg of them is used per year, are not even standardized since it has no effect on the state of affairs in the "food basket." Therefore, in those countries the hazard in medicines is not standardized either. But in our country they do not want to condone this.

The people are convinced that any content of radioactive substances in food is hazardous. This is [not] difficult to understand when man has been told for 40 years that the fallout of the "airway" is extremely hazardous, that deformed babies are being born, and cancer is appearing... But this was written for one purpose alone—to halt nuclear weapons tests. This was a noble goal, but as we may now honestly say, it was achieved by forbidden methods. And it has led to a dead-end that we cannot for the life of it escape.

[Question] The physicians of those regions to which the refugees fled expect the first wave of oncologic diseases in about two years. What data do you have on this matter? Is everything really so frightening?

[Answer] The world experience shows that if the dose is less than 50 rems, there is no increased frequency of the formation of malignant tumors or other negative effects. And a wave of oncologic diseases should not be predicted. From a professional standpoint, this is a radiologic problem. And we are not expecting a marked increase in the incidence of malignant tumors either in the next few years or beyond, except for tumors of the thyroid gland, which may appear. Indeed, iodine prophylaxis was not conducted in a timely manner everywhere. For this reason all children who received doses to the "thyroid" of more than 30 rems have been taken into account and are examined regularly. For these purposes we have imported ultrasound generators that establish the formation of the tiniest little nodes in the thyroid gland.

[Question] Enormous amounts of money have been and continue to be spent to eliminate the consequences of radioactive contamination. One deactivation cost the state more than a billion. Are these sums always used efficiently?

[Answer] I think that a great deal of money is spent in vain since all deactivation measures have little effect on dose. In any case, no one has conducted analyses. But I feel that such works cannot have any great effect.

[Question] Let us turn to Kazakhstan. There are a great deal of data, and it has been stated in the press that

deformed babies are being born with increasing frequency in the Semipalatinsk Rayon. This is related to nuclear tests...

[Answer] The birth of children with birth defects generally occurs because of oxygen deprivation of fetal tissues. But it may also be caused by many factors, including radiation. We have studied the experience of irradiation at Hiroshima. And it turned out that there was not one case of a mother who had experienced the nuclear bombing giving birth to a deformed baby. We therefore have no basis to say that there is a relationship between the explosions in Kazakhstan, Nevada, and Kyshtym and hereditary impairments. In my view, the reason lies elsewhere, that is to say, the colossal use of alcohol, the smoke-filled environment, the quality of water...

[Question] I am feeling some displeasure from your answers. The press writes that everything is bad in the regions adjacent to Chernobyl, but you say that the picture is not as bad as it is being painted. Aren't you attempting to smooth the sharp edges?

[Answer] And why would I do this?

[Question] In that case I would like to ask you: who pays your salary?

[Answer] My salary... The Ministry of Health.

[Question] The same ministry that long held the true data about the state of affairs at Chernobyl under wraps? And it is still keeping some figures a secret.

[Answer] Let us examine this. What do you mean that the Ministry of Health has kept data under wraps? They have forbidden it! Four years have passed since the explosion at Chernobyl. But our picture of the consequences is still not completely clear. All of the data on Chernobyl have been declassified.

[Question] Why is it that, holding in your hands the objective data that is such a powerful drug against fear, you so rarely use them to calm others as well?

[Answer] Prior to this I wrote a whole series of articles in the central newspapers and journals. But evidently my voice now sounds a dissonance in the chorus of voices predicting terrifying pictures of the nuclear future. That is why [my work] is not published. And in the meantime the people are deceived by nonprofessionals. I will give you an example. At the request of the Belorussian deputies, representatives of the World Health Organization visited one of their villages to check whether our measurements were lying. The point is that some "spec" with a dosimeter measured the radioactivity level in a dunghill and obtained stunning data about contamination. This stirred people up. Experts went to the same dunghill and, in fact, the instrument "went off the scale." They measure alongside it, and it was clean. And then they told the villagers to remove the dunghill and everything would be okay. There is the finale of the sensation. It happens that some fears are intentionally festered. In those places where mandatory resettlement of village residents was necessary, they were resettled long ago. But... for 3 years now we have been trying to resettle a number of Belorussian villages, including Malinovka and Chudyany, but in vain. They say, "In that case, why resettle only these two villages instead resettling several immediately so that no one is offended. The demagogy of clean water! The new Malinovka was "planted" in a contaminated site; the question of its construction was not even agreed upon with anyone.

In some residential areas people have now received 15 to 17 rems. From a common sense standpoint, there is nothing hazardous about this. They can be resettled in 5 or even 7 years. Thanks to the 35-rem concept, we have a large time margin, but this is difficult for people to understand...

These same nonprofessionals now want to destroy 3,000 tons of meat. In 1986 cattle were fattened on contaminated pastures. But the Ministry of the Agricultural Industry made a mistake; they did not make the recommendation that they should have made. As a result the meat turned out to be more active than desired—10-fold more active. And then in some places they decided not to grind it into sausage but to take it from the refrigerators and bury it. This is absurd! Indeed no one eats it constantly or intends to. And that means that there is no danger here.

[Question] But, Lev Aleksandrovich is it humane to feed people such meat? Moreover, how many rems are "sitting" in our bodies?

[Answer] You think it is a question of humanity? I have received a high dose—several hundred rems. I have participated in animal irradiation experiments. I was at the cleanup of the Urals accident, and worked at Chernobyl. But does it matter?

[Question] I think that matters. People want to believe. And this is one of those facts that causes the person with whom you are talking to trust you. But it is naive to suggest that this interview will become a pill to cure radiophobia. Fighting it is not popular now. But, you never can know, perhaps they will hear you. [Answer] I would also like to think so.

UDC 616.89-082:061.66

Ukrainian Psychiatric Consultation Center: Novel Organizational Approach to Outpatient Psychiatric Services

907C0394A Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian Vol 89 No 10, Oct 89 pp 102-105

[Article by A. A. Churkin, B. D. Petrakov, A. G. Utkov and Yu. B. Yudin, Moscow; Kiev]

[Abstract] In 1980, by directives of the Ukrainian SSR Ministry of Health, a Psychiatric Consultation Center was established at the Kiev Clinical Psychiatric Hospital

imeni Academician I. P. Pavlov. The center was designed to provide the full spectrum of psychiatric care in the Ukraine, with patients seen by referral as well as on the basis of self-admission. Between 1980 and 1987 the patient load at the center increased sevenfold, from 857 to 6,024. The ever expanding need for the center's services and the expansion of the center's programs to meet the challenge have shown unequivocally that the center fulfills a vital mission in health care. To date, it is the only such center in the USSR, and the demand for its services clearly suggests that similar centers should be established in other republics and administrative regions. References 9 (Russian).

UDC 616-084.3:681.31

Use of Computers in Mass Health Screening

907C0401D Moscow SOVETSKAYA MEDITSINA in Russian No 10, Oct 89 pp 54-56

[Article by V. Ye. Chernykh, Central Rayon Hospital, Semiluki, Voronezh Oblast]

[Abstract] At the Semiluki Central Rayon Hospital, mass health screening incorporates an ASKORS (automated system for quantitative assessment of pathologic syndrome risk) system for prescreening patients on the terminal of an Elektronika-60 microcomputer. With the computer in the dialog mode, the patient answers a series of questions indicating his lifestyle, health habits, and medical history, on the basis of which he or she is assigned to a given health risk group. The risk groups involve the following 11 categories: hyper- or hypotension; cardialgia; endocrine, hepatic, gastrointestinal, immune, pulmonary, renal, neurologic, psychiatric syndromes; alcoholism. The system is capable of processing 200 - 250 patients per shift, with a medical computer operator processing 60 - 70 forms per shift. The resultant data are then stored in an ARENA (computerized population register) or ARDIS (computerized screened-patient register) database. Figures 1; References 8 (Russian).

UDC 616.97(048)

New Approaches to Prevention of Sexually Transmitted Diseases

907C0403A Kishinev ZDRAVOOKHRANENIYE in Russian No 5, Sep-Oct 89 pp 48-49

[Article by K. V. Pasechnik, Moldavian Republic Skin and Venereology Dispensary, Kishinev]

[Abstract] A key factor in the new approach to the management and control of sexually transmitted diseases (STDs) in Moldavia is the guarantee of patient anonymity, a practice that has been shown to be very successful abroad. This eliminates the stigma associated with STDs and facilitates identification of contacts, a parameter that now approaches 82 percent. In addition, the right to treat such patients has been granted to urologists and gynecologists-obstetricians, effectively increasing the number of physicians involved in the anti-STD efforts.

UDC 616.5-076

Outbreaks and Additional Measures For the Prevention of Salmonellosis in Moldavia

907C0403B Kishinev ZDRAVOOKHRANENIYE in Russian No 5, Sep-Oct 89 pp 53-54

[Article by E. N. Shlyakhov, V. M. Dobryanskiy and I. A. Nistor, Moldavian SSR Ministry of Health; Kishinev Medical Institute]

[Abstract] Epidemiologic data show that the incidence of salmonellosis in Moldavia is the highest in the USSR and that there is no evidence of abatement. In fact, in 1988, morbidity was twofold higher than in 1987, attaining an incidence of 132.3 per 100,000 (vs. 36.6 for the USSR), with 47.5 percent of the cases consisting of enteritides. The number of food-related outbreaks continues to rise, with 16 outbreaks recorded from January to April 1989 and involving 13,331 patients. In order to control this situation, intensive educational measures have been undertaken in Moldavia that are directed at both the general population and health workers, in conjunction with stringent monitoring of the food industry.

UDC 616-082-039.57

Team Approach to Health Services and Remuneration of Medical Personnel at Outpatient Polyclinics

907C0412A Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian Oct 89 pp 25-30

[Article by N. F. Priskar, D. I. Norok and F. I. Grezhdyan, Kishinev Medical Institute· No 4 City Hospital, Kishinev]

[Abstract] Experiments at the No 7 and No 12 polyclinics in Kishinev led to the proposal of a team approach to health delivery at polyclinics as a means of enhancing efficiency. In part, the study was predicated on the fact that unwarranted referrals to specialists at polyclinics now account for 35 - 40 percent of all referrals. Five basic models are proposed: (1) Specialist team within the scope of an urban polyclinic (internists, stomatologists, OB-GYN specialists, allied health personnel); (2) general practice team (3 physicians, 3 allied health personnel); (3) specialists team (internists, pediatricians, stomatologists, OB-GYN) for home care; (4) specialists team at various institutional/industrial health clinics; and (5) specialist team limited to adult practice. In addition, 45 - 60 percent of the salary of physicians comes from the general health budget and the remainder is based on income generated by the team. In 1987, a

total of 3,168 patients were seen by the various teams, with the result that emergency calls were reduced by 30 percent and complications of coronary heart disease and ulcers by 5 percent.

UDC 614.2:616-082-039.57(477.83)

Optimization of Polyclinic Services in Lvov Oblast

907C0412B Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian Oct 89 pp 58-60

[Article by A. Ya. Ladnyy, Lvov]

[Abstract] Health care delivery in the Lvov Oblast at many polyclinics has been markedly improved through greater emphasis on patient involvement and responsibility, improved screening methods, and automation. For instance, patients have been granted the right to set up medical appointments at a time convenient for them, and are also responsible for their medical charts. In addition, more emphasis has been placed on preventive health care and utilization of KASMON software for health screening. Computerized management of clinical data and statistics have relieved physicians and nurses of routine clerical tasks and have released them for direct patient care. Special rehabilitation centers have been created at the polyclinics and at work sites to enhance the curative process. Additionally, day hospitals and outpatient surgery clinics are gaining in popularity and have had a significant impact on curtailing the length of hospitalization.

UDC 577.391.612.014.46

Prevention of Radiation Sickness Due to Low-Level Ionizing Radiation By Repeated Injection of Increasing Doses of Chemical Radioprotectors

907C0420A Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 638-643

[Article by V. S. Barkaya, R. A. Torua and Zh. V. Yelistratova, Scientific Research Institute of Experimental Pathology and Therapy, USSR Academy of Medical Sciences, Sukhumi]

[Abstract] Follow-up studies were conducted on the modification of radiation sickness resulting from prolonged low-level irradiation by multiple administration of increasing doses of combined radioprotectors. The study was conducted on SHR and (CBA x C_{57}Bl)F_1 mice weighing 18 - 22 g, guinea pigs (400 - 450 g), and rhesus monkeys (3.2 - 4.6 kg) exposed to gamma-irradiation for 16 - 25.5 h for a total dose of 8.5 - 15.3 Gy. The animals were treated subcutaneously with sodium nitrite, cystafos, and mexamine. Assessment of 30-day survival values showed that under optimal conditions, mouse and guinea pig survival improved to 58.0 percent and 82.0 percent, respectively. The control figure for mice was 14 percent. In the case of monkeys, the survival rate for the experimental animals was 4/5 and for control animals 2/5. Best survival rates were obtained when the drug combination was administered at 6 - 8 h intervals, with the following dosage combinations: 12 + 20 + 24 mg/kg sodium nitrite, 240 + 320 + 420 mg/kg cystfos, and 12 + 16 + 20 mg/kg mexamine. The mechanism of action was attributed to preservation of cellular elements capable of repopulation of depleted sites. Figures 3; References 15: 10 Russian, 5 Western.

UDC 577.361.621.386.86

Radioprotective Properties of Co(III) Biocomplex

907C0420B Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 644-647

[Article by Yu. I. Islamov, A. B. Akbarov, P. A. Khakimov, N. Kh. Shdiyeva and M. N. Islamov, Central Asian Medical Pediatric Institute, Tashkent]

[Abstract] Experimental therapeutic trials were conducted with Co(III) coordination compounds complexed with various biological ligands, including α-amino acids. Outbred male rats, 100 - 120 g, were gamma-irradiated to a dose of 5 Gy; different groups were either pretreated with 15 mg/kg of the test compound 24 h before irradiation or after irradiation with 4 mg/kg every 24 h for 25 days. Measurements of erythrocyte and leukocyte conductivities showed that pretreatment led to delay in the onset of radiation sickness, blood cytopenia was less pronounced than in the control animals, and recovery proceeded at an accelerated pace. The 30-day survival figures were increased to 90 percent in the pretreated animals and to 66 percent in the post-treated group, versus a 52 percent survival for the control animals. Additional studies on (CBA x C57Bl)F_1 mice exposed to a 8.5 Gy gamma dose followed by 4 mg/kg of the test compound every 24 h for 6 days yielded a β factor of 0.67, indicating a sufficiently high probability of radioprotection. These observations demonstrated that the compound in question may exert either a preventive or therapeutic effect, depending on the species. Figures 1; References 9 (Russian).

UDC 577.391.611.8.538.56

Glial Response in Visual Centers to Whole-Body Combined Irradiation With Microwaves and X-Rays

907C0420D Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 667-671

[Article by S. V. Logvinov, Tomsk State Medical Institute]

[Abstract] Morphometric studies were conducted on the glial elements in the visual centers of guinea pigs exposed to microwaves, x-rays, or a combination of those factors. The animals were exposed to 60 mW/cm^2, 2375 MHz microwaves or 4.5 Gy x-ray irradiation; in the combination study, microwave irradiation was followed by x-rays in one day. The end data demonstrated that pretreatment of the animals with thermogenic microwave irradiation modified the glial response to the x-rays. Combination of the two factors had an early (6 h to 5 days) synergistic effect in terms of activation and hyperplasia of astrocytes, oligodendroglias and microglia. In the late phase of the response (25 - 60 days), changes in the glial elements were less pronounced in the combination experiments than with x-rays alone, indicating that microwave pretreatment exerted a mitigating effect on late sequelae of x-ray irradiation. Figures 1; References 11 (Russian).

UDC577.391.621.386.82.517

Prediction of General Mammalian and Human Postradiation Radiosensitivity From LD_{50} of Subsequent Acute External Irradiation

907C0420H Moscow RADIOBIOLOGIYA in Russian Vol 29 No 5, Sep-Oct 89 pp 686-690

[Article by G. M. Avetisov and V. P. Volodin, Institute of Biophysics, USSR Ministry of Health, Moscow]

[Abstract] Rationale is provided for a mathematical equation relating the LD_{50} of a second irradiation to the dose employed in a preceding irradiation, for use in estimating postradiation sensitivity of mammals in general and humans in particular. Factors taken into consideration include the previous dose, time elapsed, and paramaters reflecting cellular viability and proliferation.

Experimental data derived for mice, sheep, hamsters, rabbits and dogs demonstrated the utility and reliability of this approach, and showed that data based on the Blair model underestimate LD_{50} values for subsequent irradiation. The error with the Blair model approaches 100 percent when the second irradiation is conducted within 15 days of the first. Figures 1; References 13: 8 Russian, 5 Western.

UDC 619:615.371:616.981.42

Biological Activity and Effectiveness of Vaccine Against Brucellosis From Strain 19

907C0331A Moscow VETERINARIYA in Russian No 10, Oct 89 pp 26-27

[Article by M. Ya. Yartsev, A. Ya. Samuylenko, V. P. Shishov, A. A. Maslak, N. D. Skichko, N. I. Zenov, V. N. Melnik, Ye. M. Murashkina, Z. P. Bondarenko, K. V. Shumilov, N. A. Mikhaylov, A. I. Klimanov, Yu. A. Shikhaleyev, V. V. Kalmykov, O. D. Sklyarov, V. K. Grinko, R. G. Yarayev, S. A. Nazarova, M. Abdullayeva, All-Union Scientific Research and Production Institute of Biological Industry; Shchelkovo Biocombine; All-Union State Scientific Design Institute for Veterinary Preparations; Uzbek Scientific Research Veterinary Institute]

[Abstract] After developing an industrial technology for producing vaccine in variable-parameter fermenters for submerged cultivation of brucella, the researchers produced an anti-brucellosis vaccine from strain No 19 and studied the immunogenic activity and the viability of the brucella during storage. They used Elektroluks fermenters with capacities of 0.5 m^3 and 0.3 m^3. The microorganism culture was precipitated, dissolved in a protective medium, packed in penicillin flasks and ampules, and subjected to sublimation. For study, 49 series (32 series packed in flasks and 17 series in ampules) out of 367 series of the preparation (10.8 million doses) were chosen. The preparation was stored at 4 - 8°C for 12 months (length of the study). Safety and immunogenic activity of 15 series of the preparation (including two control samples) were tested on guinea pigs. All series of vaccine prepared by the new technology and packed in flasks and ampules were found to be harmless. Immunogenicity was 98.4 percent for samples in flasks and 98.3 percent for those in ampules, as opposed to 97.5 percent in the control. Conditions of sublimation and packing did not affect viability of the brucella. The new production process provided a biologically stable, highly immunogenic preparation and increased efficiency of production. References 6: 4 Russian; 2 Western.

AIDS—Acquired Immunodeficiency Syndrome

907C0385E Kiev MIKROBIOLOGICHESKIYE ZHURNAL in Russian Vol 51 No 5, Sep-Oct 89 pp 97-98

[Review by G. K. Paliy and A. A. Chesnokova of book V. P. Shirobokov, A. I. Yevtushenko, N. M. Kovaleva, O. N. Kornyushenko, and N. I. Bolyko, "AIDS—Acquired Immunodeficiency Syndrome," Kiev, Zdorovye, 1988, 231 pages]

[Abstract] This book, reviewed by G. K. Paliy and A. A. Chesnokova, is the first monograph on AIDS published in the USSR. The book consists of an introduction, six sections, a conclusion and 704 bibliographic entries. The introduction presents a detailed description of the global nature and complexity of AIDS and the universal trend of the spread of the disease. Section 1 describes basic stages of the history of the discovery of the AIDS virus, the origin and evolution of the pathogen and a detailed description of its structure. Chapter 2 of that section describes the epidemiology of AIDS. The section "Pathogenesis and Immunity" presents data concerning where the AIDS pathogen is found in the body, mechanisms which play a role in development of immunity, and hypotheses explaining pathogenetic mechanisms of AIDS. Factors which promote immunosuppression during AIDS are discussed. The book presents extensive materials concerning the taxonomic position of pathogens of opportunistic infections of different etiology during AIDS. It describes clearly the clinic, criteria of diagnosis of AIDS, stages of development of the disease, diagnosis and treatment. The section "Laboratory Diagnosis" assesses methods of indicating the AIDS virus, detecting anti-virus antibodies and determining specific changes in the immune system. The book describes measures of non-specific prophylaxis in detail. The complete legislative documents (the 1987 Decree of the Presidium of the Supreme Soviet USSR "Measures For Preventing Infection by the AIDS Virus", and the 1987 "Rules of Medical Examination to Detect Infection by the AIDS Virus") are found in the book. Protective measures for attending medical personnel are given. The conclusion briefly formulates the most important patterns of the pathogenesis of AIDS and reports on development of effective therapeutic and prophylactic drugs both in the USSR and abroad.

UDC 616.092:612.017.1.064]-022.7:578.828.6]-078-035.7

Possible Variation of Erroneous Diagnosis of HIV Infection

907C0605B Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 62 No 1, Jan 90 pp 97-99

[Article by S. A. Kalikanov, A. I. Chabanenko, Yu. P. Reznikov, S. A. Arakelov, V. M. Stakhanova, District Military Hospital No. 1586, Moscow Military District, USSR Defense Ministry; Scientific Research Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences]

[Abstract] A description is presented of a 20-year-old private with chronic pyelonephritis who tested positive for antibodies to human immunodeficiency virus (HIV). According to current concepts, antibodies to HIV are detected in most cases within six weeks of infection (the first antibodies to appear are antibodies to core antigens; within an additional two weeks to two months, antibodies to env antigens appear. Such a time frame in the detection of antibodies to HIV may be tied to poor sensitivity of the immunoblot with respect to the *env* antibodies, which, in some cases, may be blocked by, for example, a rheumatoid factor. Three to four months after infection, immunoblot should show the entire spectrum of anti-HIV antibodies. That was not the case with the private. Based on the data obtained, suspicion of the HIV infection was removed. The researchers suggest that the initial false positive in the immunoblot may indicate infection with an as-yet-unknown retrovirus that has the same antigenic determinants as HIV. In connection with that, blood exhibiting such determinants cannot be used for transfusion until the nature of the reactivity is discovered. For that reason, at least two screening tests need to be performed when testing blood for HIV, one of which would detect sera that react in the immunoblot to antigens p17-p55, and the other of which would react only to HIV. Figure 1, References 7: 1 Russian, 6 Western.

Detecting Genotoxic Substances in Environment

907C0604C Kiev EKSPERIMENTALNAYA ONKOLOGIYA in Russian Vol 12 No 1, Jan-Feb 90 p 79

[Article by V. V. Khudoley]

[Abstract] The All-Union symposium "Volume and Methods of Genotoxic Assessment and Side Effects of Biologically Active Substances" was held May 22-26, 1989, in Leningrad. New data were presented on the use of an alkaline elution technique for studying the harmful effect of chemicals on DNA. A variation of a plasmid SOS-chromotest which makes it possible to detect mutagens in the environment with greater precision was developed. There is a new technique for rapid testing of genotoxicants based on the induction of transposons. These studies are very promising for considering the unusual chromosomal occurrences that may play an important role in carcinogenesis. A test system has been created for yeast-saccharomycetes to detect various induced genetic occurrences that will provide greater advantages for expanding the study of mutagenesis mechanisms. Special attention was paid to tests for detecting tumor promoters, that is, substances that are not genotoxicants but play a substantial role in carcinogenesis. The symposium provided much new information for solving practical problems of detecting mutagens and carcinogens in the environment.

UDC 576.3:613.69

Positional Homeostasis of Cell and Problem of Morphogenesis in Gravitational Field

907C0598A Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 109 No 1, Jan-Feb 90 pp 47-64

[Article by M. G. Tairbekov, Biomedical Problems Institute of the USSR Ministry of Health]

[Abstract] Homeostasis of the cell and morphogenesis processes in a gravitational field were studied. The structural and functional organization of the cell should be examined as a microscopic chemical reactor that operates according to the laws of biological thermodynamics and as a mechanical structure in a stressed state in a gravitational field as a result of the constant resistance of gravity. Positional homeostasis characterizes the stable position and optimal orientation of cells in a gravitational field and the amount of energy the cell expends to reach that stability. Studies conducted in weightlessness in spacecraft and in ground-based laboratories to simulate the effects of changes in gravity make it possible to assess the evolutionary role of gravitation in the formation and development of biological systems; such studies also reveal the physiological mechanisms of the adaptation of organisms to changes in gravity. Data indicate that changes occurring in live systems on the cellular level following a shift in the amount and direction of a gravitational vector are adaptational and reversible and do not lead to pathology. It is postulated that the degree of the effect of gravity on the cell is a function of the dimensions of the cell and the stress of the gravitational field. Study of the processes of morphogenesis and embryonal induction in the gravitational field is an important problem of gravitational biology. The purpose of this research is to determine the causative factors that regulate and control the formation of an embryo with a full complement of differentiated tissues and developed organs from a zygote. The main emphasis of this problem is to establish the mechanisms of activation of the germ cell, stimulation of its division, and differentiation in normal gravity as well as after a change in the size and direction of the vector of the gravitational field. Continuation of these studies is important to the continuous functioning of spacecraft orbiting in near-Earth space as well as for prolonged interplanetary flights. References 65: 25 Russian, 40 Western.

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